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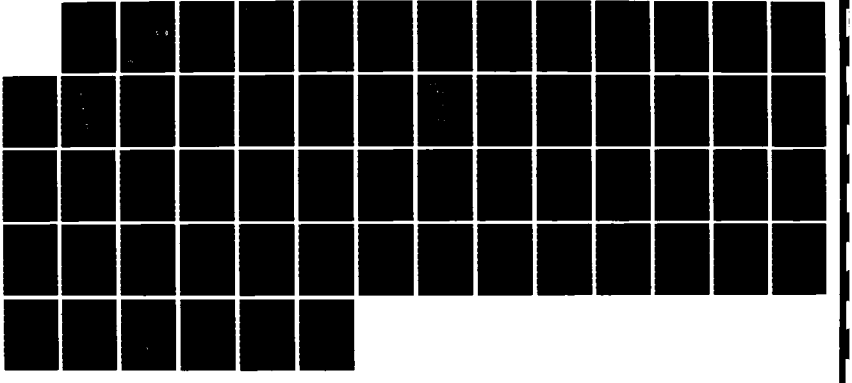

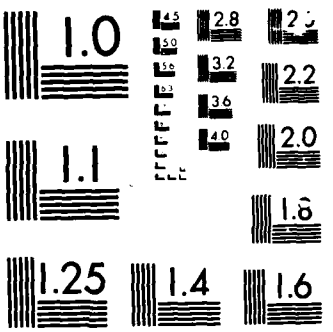
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Reconnaissance Report

Cattaraugus Creek New York

Main Report

US Army Corps
of Engineers
Buffalo District

March 1986

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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flood damage
reservoirs

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The primary water resources need for which a solution is sought in this study, is to reduce flood damages within the Cattaraugus Creek basin. In addition, for the dam/reservoir plans that were developed, the addition of hydroelectric power generating facilities and recreation facilities were also considered to maximize the economic efficiency of the basic flood control plans.

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DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO
ATTENTION OF

CATTARAUGUS CREEK STUDY
NEW YORK

CATTARAUGUS CREEK STUDY
NEW YORK

RECONNAISSANCE REPORT

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ACKNOWLEDGEMENTS

This Reconnaissance Report was prepared through the efforts of many individuals on the Interdisciplinary Team within the Buffalo District of the Corps of Engineers. The following are the Corps personnel who were most instrumental in conducting the investigations and preparing the text presented herein:

Richard Aguglia	Project Manager
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Leonard Kotkiewicz	Civil Engineer Technician
Roger Repp	Civil Engineer Technician
James Wheeler	Civil Engineer Technician
Lawrence Dunfee	Real Estate Specialist

The report itself was produced through the efforts of many other Corps personnel, including the following who contributed significantly to its preparation:

Irving Stone	Chief, Drafting Section
John Acker	Drafting Section
Mary Ann Schultz	Word Processor
Linda Sauberan	Word Processor

The Buffalo District Commander during preparation of this Reconnaissance Report was Colonel Daniel R. Clark; the Chief of the Engineering Division was Kenneth R. Hallock; and the Chief of the Planning Division was John Zorich.

Finally, the efforts of other individuals who participated in the study and report preparation, but whose names have not been mentioned above, are gratefully acknowledged.

SECTION I
INTRODUCTION

The purpose of this section is to introduce the reader to the Cattaraugus Creek Study Reconnaissance Report and to explain the content and organization of this report. The section presents information on the geographical setting of the study area, the study authority, the purpose of the study, the scope of the study, study participants and coordination, the organization of the report, and prior studies and reports in the area.

1. GEOGRAPHICAL SETTING

Cattaraugus Creek is about 70 miles long and drains an area of about 558 square miles of Western New York as shown on Figure 1. The creek rises in the Appalachian plateau in western New York and flows in a westerly direction to its mouth in Lake Erie, 25 miles southwest of Buffalo, New York. Terrain of the basin varies from the hilly, steep-sloped and narrow valleyed portion of the basin upstream of Gowanda to the flat-sloped and wide-valleyed Lake Erie plain downstream of Gowanda.

The Cattaraugus Creek Basin is predominately rural, however, the main branch of the creek passes through the villages of Arcade, Gowanda, and Springville. The lower 16 miles of the creek also flows through the Cattaraugus Indian Reservation. The main tributaries of the creek include Clear Creek at Arcade, Elton Creek, Buttermilk Creek, Spring Brook, Spooner Creek, South Branch Cattaraugus Creek, and Clear Creek at Iroquois.

2. STUDY AUTHORITY

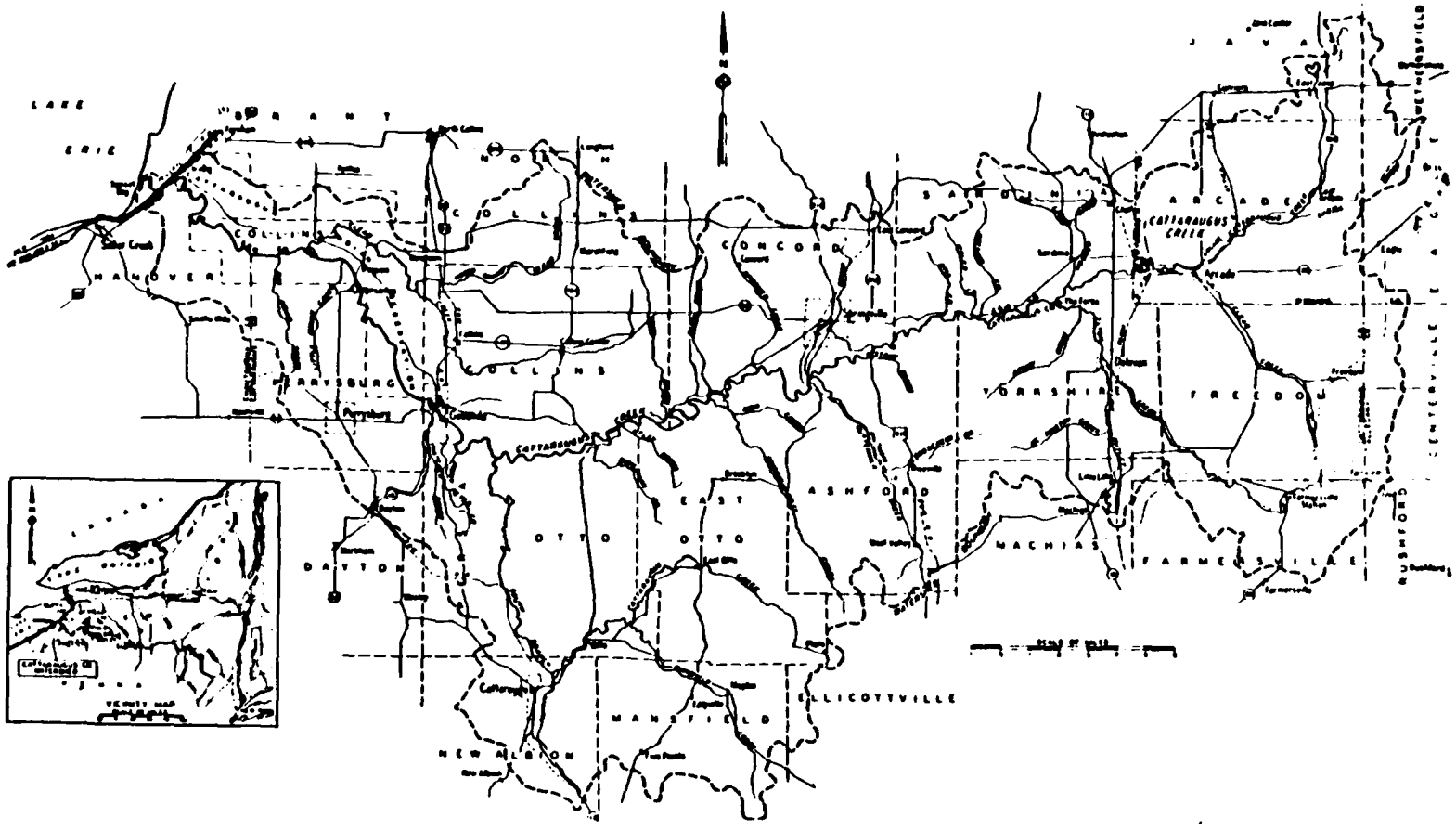
The Cattaraugus Creek Study was authorized by two resolutions - one adopted 2 June 1956 by the Committee on Public Works of the United States Senate at the request of the late Senator Irving M. Ives and the other adopted 23 July 1956 by the Committee on Public Works of the House of Representatives at the request of former Congressman John R. Pillion of the 42nd District. Text of the two resolutions is as follows:

2 June 1956 Senate Resolution

"RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports of the Chief of Engineers on Cattaraugus Creek, New York, transmitted to Congress on November 25, 1949, and other reports, with a view to determining whether any modification of the recommendations contained therein is advisable at the present time."

23 July 1956 House Resolution

"Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on Cattaraugus Creek, New York, submitted to the Congress on November 25, 1949, with a view to determining whether improvements for flood control are advisable at this time."



CATTARAUGUS CREEK STUDY
NEW YORK

BASIN MAP

U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

FIGURE 1

FIGURE 1

3. PURPOSE OF RECONNAISSANCE REPORT

In accordance with the authorizing resolutions, the Cattaraugus Creek Study was initiated in 1965. A Preliminary Feasibility Report, recommending further study of a local protection project in the village of Gowanda, was completed in 1966. Detailed studies on this plan were initiated shortly thereafter and continued until funds were exhausted in 1970. In this same time period, preliminary studies of three reservoir sites were also conducted. Again, the studies continued until funds were exhausted in 1970.

In Fiscal Year 1985, funds were provided to resume the Cattaraugus Creek Study. The first activity in this resumption was completion of this Reconnaissance Report, the first step in the Corps of Engineers study process. The primary purpose of this Reconnaissance Report is to document the results of the reconnaissance study effort conducted to identify the water and related resources problems and needs in the basin and to provide a preliminary indication of the potential of the study to yield solutions to these problems and needs which could be recommended to the Congress as Federal projects. In this endeavor, data from the previous studies were extensively utilized. The second purpose of the reconnaissance study, assuming a favorable result, is to develop a plan of action, including its associated costs, to complete the feasibility phase of the study. In the feasibility phase, detailed studies are conducted on the most promising alternatives to: (1) identify all major components of each alternative; (2) to estimate the first cost of construction and the annual operation and maintenance cost associated with each alternative; (3) to estimate the benefits associated with each alternative; and (4) to assess the impacts of each alternative. These studies are conducted in sufficient detail so that a rationale choice can be made among them and, if appropriate, an alternative can be recommended for implementation.

4. SCOPE OF STUDY

The scope of this reconnaissance study was primarily limited to formulation, assessment and evaluation of plans to reduce flood damages in the Cattaraugus Creek Basin. These plans included both regional (i.e., dam/reservoir) projects and local protection projects in areas where there is a high concentration of flood damages. In addition, for the dam/reservoir plans that were developed, the addition of hydroelectric power generating facilities and recreation facilities were also considered to maximize the economic efficiency of the basic flood control plans. As will be discussed in Section III of the Main Report, "Problem Identification," although other traditional Corps water resources areas were investigated (i.e., commercial navigation, water supply, streambank erosion, and water quality), the studies indicated that either: (1) there was no unmet need in this area (commercial navigation); (2) solution of the problem was outside the authority of the Corps of Engineers (water supply and streambank erosion); or (3) other agencies were taking the lead in solving the problem (water quality). Thus, no further studies were conducted in these other water resource areas.

5. STUDY PARTICIPANTS AND COORDINATION

One of the first actions accomplished during the reconnaissance study was to send letters to Congressional leaders and State and local officials informing them that the Cattaraugus Creek Study had been resumed. A news release was also issued to inform the general public. This was followed shortly thereafter by a study newsletter providing them with a brief overview of past studies and the anticipated future directions of the current study. The newsletter also requested their input as the study progresses.

Coordination was also initiated with various Federal, State, and local agencies in order to identify water resources problems and needs in the basin and to obtain information on existing or proposed land use plans, known cultural resources and fish and wildlife resources, including threatened and endangered species. This coordination was accomplished through both formal correspondence and numerous workshop meetings. Coordination was also initiated with local government officials during the same time period, including officials of the town of Otto and village of Springville where dam/reservoir alternatives for flood control and allied purposes were under consideration. Further, as hydroelectric power generating facilities were being considered as an add-on feature to the basic dam/reservoir alternatives at these locations, coordination was also initiated with the electric power companies having jurisdiction within the study area. Information was requested on past hydropower studies they may have conducted and also whether or not they would be interested in developing hydroelectric power generating facilities at these locations.

6. THE REPORT

The overall organization of this report consists of a Main Report and supporting documentation. The Main Report is written to give both the general and technical reader a clear understanding of the study, the study results, and the key decisions and conclusions. The supporting documentation provides additional detailed information on the design, costs, and benefits of the alternatives studied. It also includes copies of pertinent correspondence with organizations and individuals significant in the development of this study. Copies of the supporting documentation are available at the Buffalo District Office.

7. PRIOR STUDIES AND REPORTS

Many studies of the water resources problems and needs in the Cattaraugus Creek Basin have been made. The following is a summary of the various reports pertinent to this reconnaissance study:

a. An unfavorable report was submitted to Congress on 11 July 1939. The report, which was of preliminary examination scope, was principally concerned with flooding in the vicinity of the creek mouth at Lake Erie.

b. A report - "Preliminary Examination of Shores of Lake Erie for Harbors and Harbors-of-Refuge for Light Draft Vessels," dated 19 July 1946 - recommended the mouth of Cattaraugus Creek for further detailed study in the interest of small-boat navigation.

c. An unfavorable report was submitted to Congress on 25 November 1949. The report, which was of preliminary examination scope, was principally concerned with flooding of Cattaraugus Creek and the Thatcher Brook tributary at Gowanda, New York.

d. A Preliminary Feasibility Report for flood control improvements in the village of Gowanda on Cattaraugus Creek and Thatcher Brook was approved by North Central Division on 9 December 1966. The report concluded that further study of Cattaraugus Creek in Gowanda in the interest of flood control was warranted.

e. An interim report on the comprehensive study for the establishment of harbors and harbors-of-refuge for light-draft vessels on the south shore of Lake Erie with appropriate consideration of flood problems near the mouth of Cattaraugus Creek was completed in 1966. The report was subsequently printed as House Document 97, 90th Congress, 1st Session and became the basis for construction of a multi-purpose project completed in January 1983. The project provides a harbor for safe and easy navigation of small craft and refuge from lake storms. In addition, the project was intended to reduce flood damage to properties near the mouth and provide opportunity for breakwater fishing.

f. The final edition of a report entitled "Development of Water Resources in Appalachia" was completed in December 1969. This report was prepared by the Office of Appalachian Studies, Corps of Engineers, Cincinnati, Ohio, in response to Section 206 of the Appalachian Regional Development Act of 1965. The report recommended survey scope studies for three potential reservoir sites in the Cattaraugus Creek Basin and for a local protection project at Gowanda.

g. A Section 205 Reconnaissance Report for flood problems on an unnamed tributary to Cattaraugus Creek at Arcade, New York, was completed on 8 November 1974. The report stated that local interests were implementing a plan that would alleviate the flood problem in this area and recommended no further Federal action.

h. A Section 205 Report for flood problems on the Cattaraugus Indian Reservation was completed on 19 June 1978. Due to an unfavorable benefit-to-cost ratio, no further Federal action was recommended.

i. A Section 205 Reconnaissance Report for flood problems on the Cattaraugus Indian Reservation was completed on 5 May 1983, but it was determined that no Federal action was required as local interests had implemented a plan that alleviated the flood problems.

j. A Section 14 Initial Appraisal Report on Erosion along Cattaraugus Creek at North Street, Arcade, New York, was completed in February 1985. Based on the findings of the investigation, it was recommended that no Federal action be taken in regard to the erosion problem because of the lack of economic justification.

SECTION II
EXISTING CONDITIONS

The purpose of this section is to present the environmental setting without the project to permit impact assessment of the various alternatives. The information presented will provide a data base for impact assessment and evaluation purposes.

8. MAN-MADE HUMAN ENVIRONMENT

a. Community and Regional Growth.

Figure 2 identifies the location of major communities within the Cattaraugus Creek Basin. The following subsections pertain to aspects of community regional growth:

(1) Population - Table 1 identifies the 1980 population and growth trend since 1970 for Erie, Wyoming, Chautauqua, and Cattaraugus counties, and more specifically, for those townships and villages situated within the Cattaraugus Creek Basin. The 1980 population within the basin was about 57,363. Moderate population growth within the basin is expected in the future.

(2) Land Use and Development - Table 2 identifies general land use within the basin derived from available regional and county data. Agricultural (42%) and forest-brush-recreational and vacant (41%) land use occupy the greater portion of the basin, followed by residential (14%) land use and other developmental land use. Water and wetland areas account for approximately 3 percent of the basin area. Some future growth in residential, commercial, industrial, public, and transportation development is anticipated in the basin. No significant change in water and wetland area is expected. Development will likely occur around existing community developments and/or along major transportation routes. Growth areas include the townships of Concord, Sardinia, Arcade, Java, Otto, New Albion, Ashford, Yorkshire, Machias, and the Seneca Nation's Cattaraugus Reservation. Two areas of unique consideration within the basin include: (1) the aforementioned Cattaraugus Seneca Indian Reservation, and (2) the New York State Nuclear Service Center - which is located along Buttermilk Creek in the town of Ashford (West Valley), New York, which is a tributary to Cattaraugus Creek. This Service Center is the nation's first nuclear processing plant which serves the scientific, educational, medical, governmental, and industrial organizations of New York State. Its on-site facilities include a nuclear fuel reprocessing plant and a nuclear waste cemetery. The cemetery contains tanks and burial areas for high-level liquid and solid wastes, and for low-level solid wastes. Low-level liquid wastes pass through a series of holding lagoons and are discharged into Buttermilk Creek. The rate of discharge is dictated by the flow in Cattaraugus Creek at the mouth of Buttermilk Creek. The levels of radio-active waste in Cattaraugus Creek are held within the limits specified by Part 20, Title 10, of the Federal Code of Regulations.

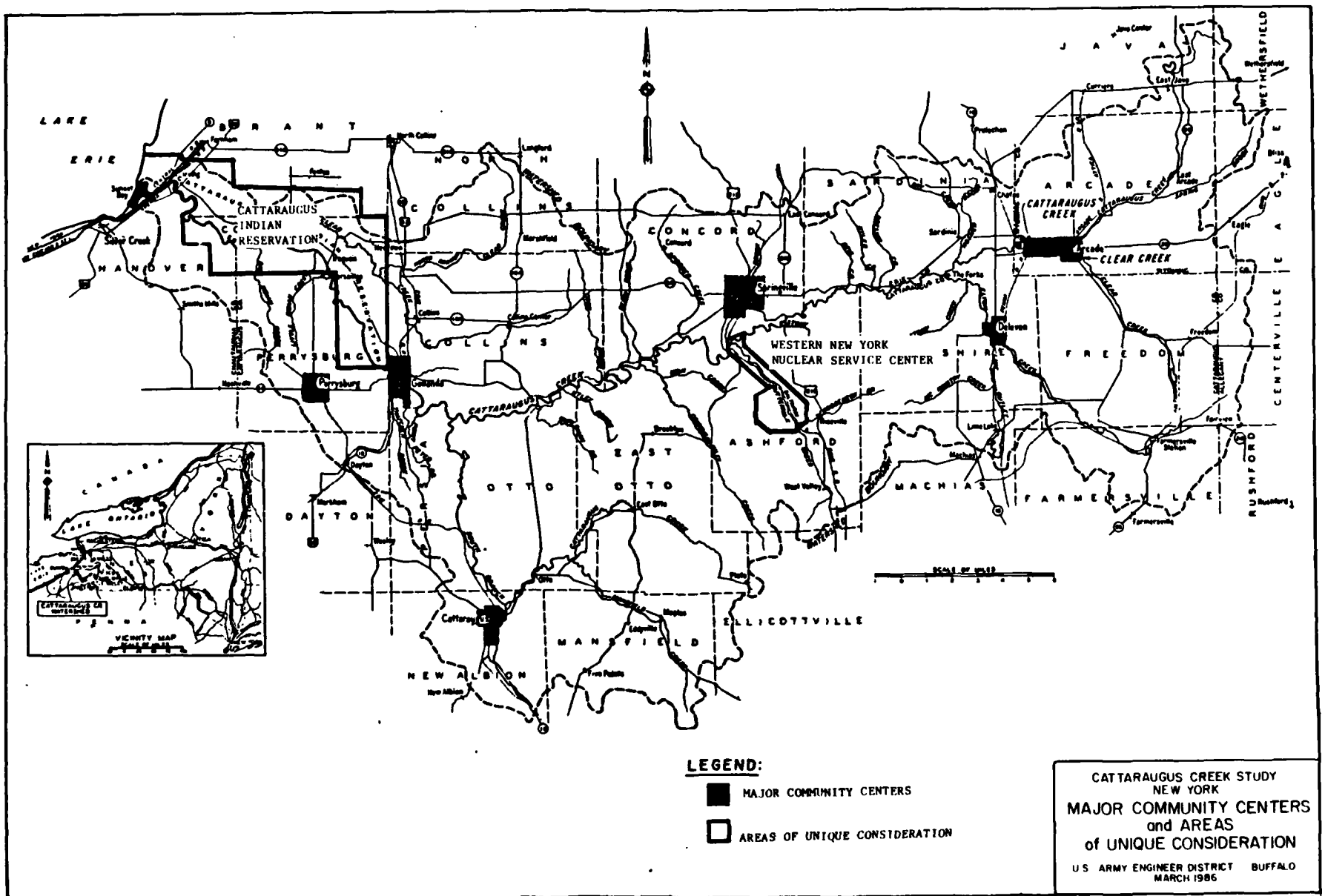

LAKE ERIE
BRANT
NORTH COLLINS
CONCORD
SARDINIA
JAVA
ARCADE
WETHERSFIELD
CENTERVILLE
CATTARAUGUS INDIAN RESERVATION
CATTARAUGUS CREEK
CLEAR CREEK
HANOVER
PERRYSBURG
COLLINS
Springville
Arcade
Delevan
WESTERN NEW YORK NUCLEAR SERVICE CENTER
SHIRLEY
FREEDOM
CATTARAUGUS CREEK
EAST OTTO
OTTO
ASHFORD
MACHIAS
FARMERSVILLE
RUSHFORD
DAYTON
ELLICOTTVILLE
MANSFIELD
NEW ALBION
VICINITY MAP
LEGEND:
MAJOR COMMUNITY CENTERS
AREAS OF UNIQUE CONSIDERATION
CATTARAUGUS CREEK STUDY
NEW YORK
MAJOR COMMUNITY CENTERS and AREAS of UNIQUE CONSIDERATION
U S ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

FIGURE 2

Table 1 - Local Population and Change

Area	1970	1980	Change	2000 (Projected)	Change
Erie County					
N. Collins	4,100	3,778	-	6,200	+
Collins	6,400	5,053	-	7,800	+
N. Gowanda (V)*	3,100	2,713	-	3,900	+
Concord	7,600	8,171	+	10,100	+
Springville (V)	4,400	4,285	-	5,000	+
Sardinia	2,500	2,792	+	3,700	+
Wyoming County					
Arcade	3,000	3,609	+	3,600	•
Arcade (V)	2,000	2,052	+	2,300	+
Java	1,900	2,378	+	2,700	+
Chautauqua County					
Hanover	7,800	7,878	+	9,400	+
Cattaraugus County					
Perrysburg	2,200	2,180	•	3,400	+
Perrysburg (V)	400			6000	+
Dayton	2,000	1,952	•	2,600	+
Persia	2,600	2,477	-	2,900	+
Otto	700	828	+	900	+
E. Otto	900	942	•	1,000	
New Albion	2,000	2,161	+	2,500	+
Cattaraugus (V)	1,200	1,200	•	1,300	+
Mansfield	600	784	+	600	-
Ashford	1,600	1,922	+	1,900	•
Yorkshire	2,600	3,550	+	3,800	+
Machias	1,700	2,062	+	2,000	-
Freedom	1,400	1,840	+	1,400	-
Farmersville	800	1,048	+	900	-
Seneca Nation					
Erie County	1,100	1,612	+	1,200	-
Cattaraugus County	300	346	+	500	+

SOURCES: NYS Department of Commerce (1980)
NYS Department of Environmental Conservation 1981 Projections

* (V) denotes 'Village'

Table 2 - Cattaraugus Creek Basin Land Use, 1980 (Est.)

Land Use	Percent	Acres	Anticipated Change
Residential	14	44,800	++
Com./Public/Semi-Public	.7	2,240	+
Industrial	.5	1,600	+
Forest/Brush/Rec./Vacant	41	131,200	+/-
Agricultural	42	134,400	+/-
Water/Wetland	3	9,600	0
Transportation	-	-	+

SOURCE: County & Regional Data Books (1975-1980)

(3) Business and Industry/Employment and Income - Manufacturing is the major industry and employment sector followed by the wholesale-retail and service sectors. The average unemployment rate for the four county area in 1980 was about 6.7 percent. The average median family income for the four county area in 1980 was about $18,306. Projections (Table 3) indicate that employment in the manufacturing sector is expected to decline while employment in wholesale/retail and service oriented sectors is anticipated to grow.

The total economy of the Cattaraugus Creek Basin is diversified with substantial portions of trade, manufacturing and agriculture. The basin is generally rural and agriculturally oriented. Agricultural activities include dairy, forestry and minor food crop production. Industrial and commercial developments are generally situated within or near community nodes along major transportation routes.

(4) Recreation - Western New York is abundant in water resources, recreational facilities, and opportunities for recreation. Review of the New York Statewide Comprehensive Recreation Plan indicates that the most sizable future recreation deficiencies and developmental needs are expected in day-use and local winter facilities, with notable needs also in camping, and boating. Skiing, golfing, fishing, and hunting demands are expected to tax existing facilities. Trail activies may also need to be accommodated.

Except for Lake Erie, most of the medium to larger existing reservoirs are located a considerable distance from the city and residents of the Buffalo Metropolitan area. Generally, the periphery of the sizable lakes closest to the Buffalo area are extensively developed. In most cases, facilities are either developed and utilized extensively, while in others, facilities could probably be further developed.

The natural resources of the area contribute significantly to the recreational developments of the Cattaraugus Creek Basin. Cattaraugus Creek itself offers an excellent fishery. The basin provides hunting opportunities for small and large game animals and opportunities for birdwatching. The basin's recreational developments support activities such as fishing, hunting, boating, camping, hiking, horseback riding, swimming, skiing, snowmobiling, and picnicking. Zoar Valley along Cattaraugus Creek just east of the village of Gowanda is considered to be a special scenic resource of importance in the State, and it may also have potential as a significant resource for national consideration. In general, demand for recreation facilities is increasing due to population growth and increased leisure time and income.

(5) Agriculture and Farmland - Agricultural activities in the basin include dairy, forestry, and food production to some degree. Reference Figures 3, 4, and 5 identify prime farmland areas within the basin, soil productivity for agricultural use, and county designated agricultural districts in the basin.

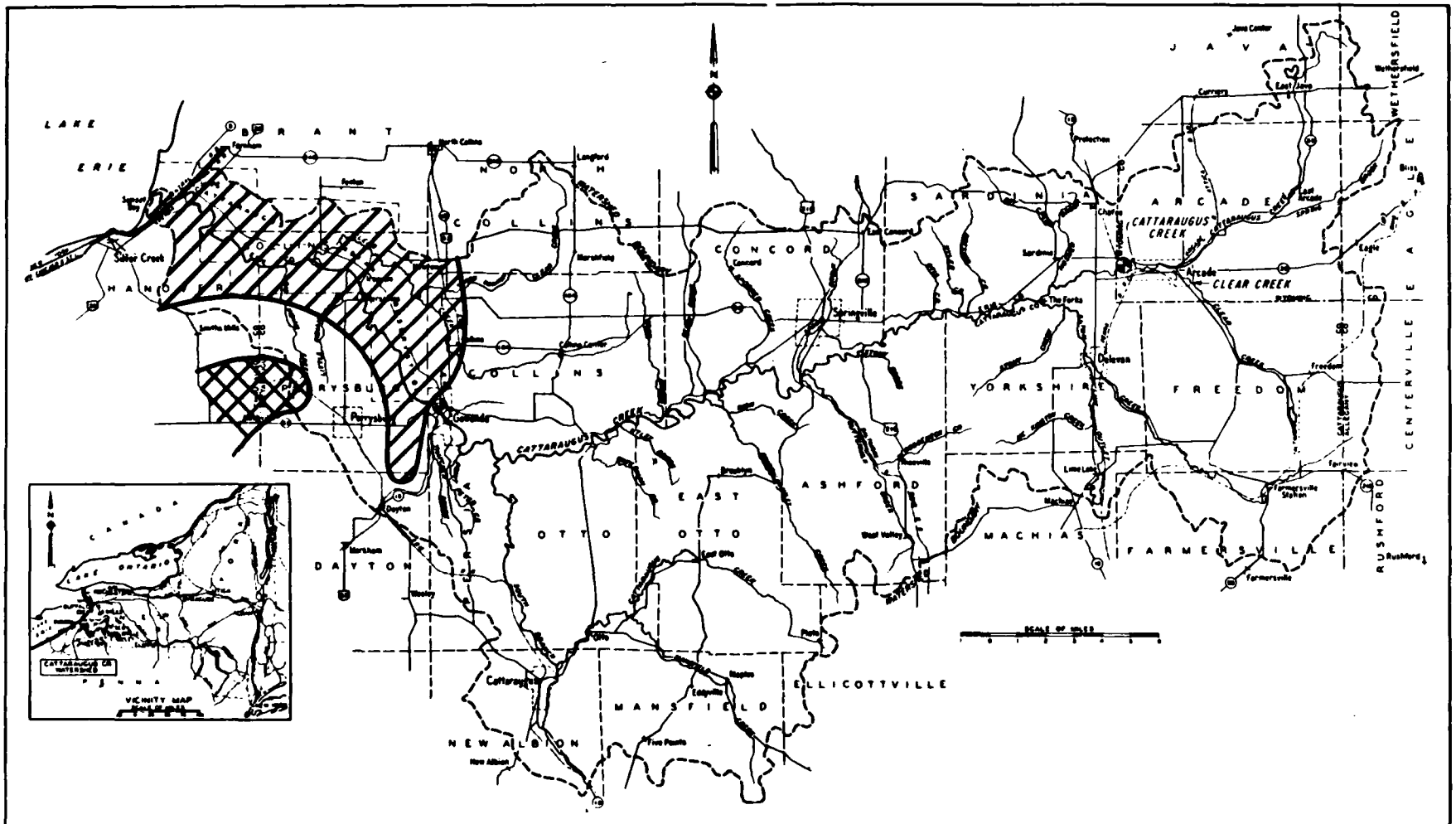
(6) Public Facilities and Services -

(a) Water Supply - Most of the municipal and individual water supply in the basin is obtained from wells. Figure 6 identifies the major area of

Table 3 - Employment by Industry by Place of Work, 1969 and 1978, and Projected, 1985-2030
(Total Number of Jobs)

	Historical		No-Change-in-Share				Low-Change-in-Share				Moderate-Change-in-Share			
	1969	1978	1985	1990	2000	2030	1985	1990	2000	2030	1985	1990	2000	2030
Total Employment	548,210	554,229	579,305	580,307	561,320	508,902	592,621	597,642	581,568	529,396	596,706	605,110	593,805	545,563
Agricultural Production	3,906	4,083	3,835	3,639	3,400	2,880	3,820	3,620	3,379	2,861	3,814	3,610	3,362	2,841
Nonfarm	544,304	550,146	575,470	576,668	557,921	506,022	588,801	594,022	578,189	526,535	592,891	601,500	590,443	542,722
Private	457,208	459,348	484,250	486,413	471,115	426,776	496,518	502,436	489,897	445,852	500,275	509,329	501,244	460,914
Agricultural Services, Forestry Fisheries, and Other	1,249	1,555	1,653	1,729	1,754	1,729	1,657	1,733	1,759	1,733	1,657	1,733	1,756	1,728
Mining	273	557	578	565	534	450	746	780	774	663	728	778	805	724
Construction	23,515	21,935	25,952	28,158	31,698	36,115	27,190	29,864	33,921	38,760	27,588	30,640	35,349	40,963
Manufacturing	180,384	146,003	144,882	139,633	125,460	100,354	143,867	138,266	123,922	99,020	143,424	137,332	122,287	97,055
Nondurable Goods	55,498	43,794	41,846	39,916	35,063	27,392	42,285	40,423	35,559	27,791	42,400	40,580	35,724	27,921
Durable Goods	124,886	102,209	103,036	99,717	90,397	72,963	101,581	97,843	88,363	71,229	101,024	96,752	86,564	69,134
Transportation and Public Utilities	33,541	28,818	29,054	28,755	27,162	23,684	28,585	28,150	26,489	23,068	28,419	27,833	25,964	22,418
Wholesale Trade	25,087	27,578	28,981	28,489	26,421	22,330	30,032	29,770	27,771	23,513	30,338	30,262	28,435	24,210
Retail Trade	87,830	96,018	99,132	99,323	96,596	86,742	102,210	103,229	100,985	90,854	103,189	104,979	103,743	94,192
Finance, Insurance, and Real Estate	20,033	23,275	26,079	26,591	25,737	23,193	27,483	28,407	27,769	25,103	27,932	29,223	29,043	26,642
Services	85,296	113,609	127,937	133,170	135,753	132,180	134,748	142,236	146,509	143,136	136,999	146,549	153,861	152,981
Government	87,096	90,798	91,221	90,255	86,805	79,246	92,283	91,586	88,292	80,683	92,617	92,171	89,199	81,808
Federal Civilian	9,480	9,530	9,520	9,583	9,644	9,659	9,819	9,963	10,084	10,119	9,913	10,130	10,352	10,476
Federal Military	7,772	4,433	4,416	4,416	4,416	4,416	4,416	4,416	4,416	4,416	4,416	4,416	4,416	4,416
State and Local	69,844	76,835	77,284	76,255	72,746	65,171	78,048	77,207	73,791	66,148	78,288	77,625	74,431	66,915

SOURCE: 1980 OBERS BEA Regional Projections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CONCORD
SARDINIA
JAVA
ARCADE
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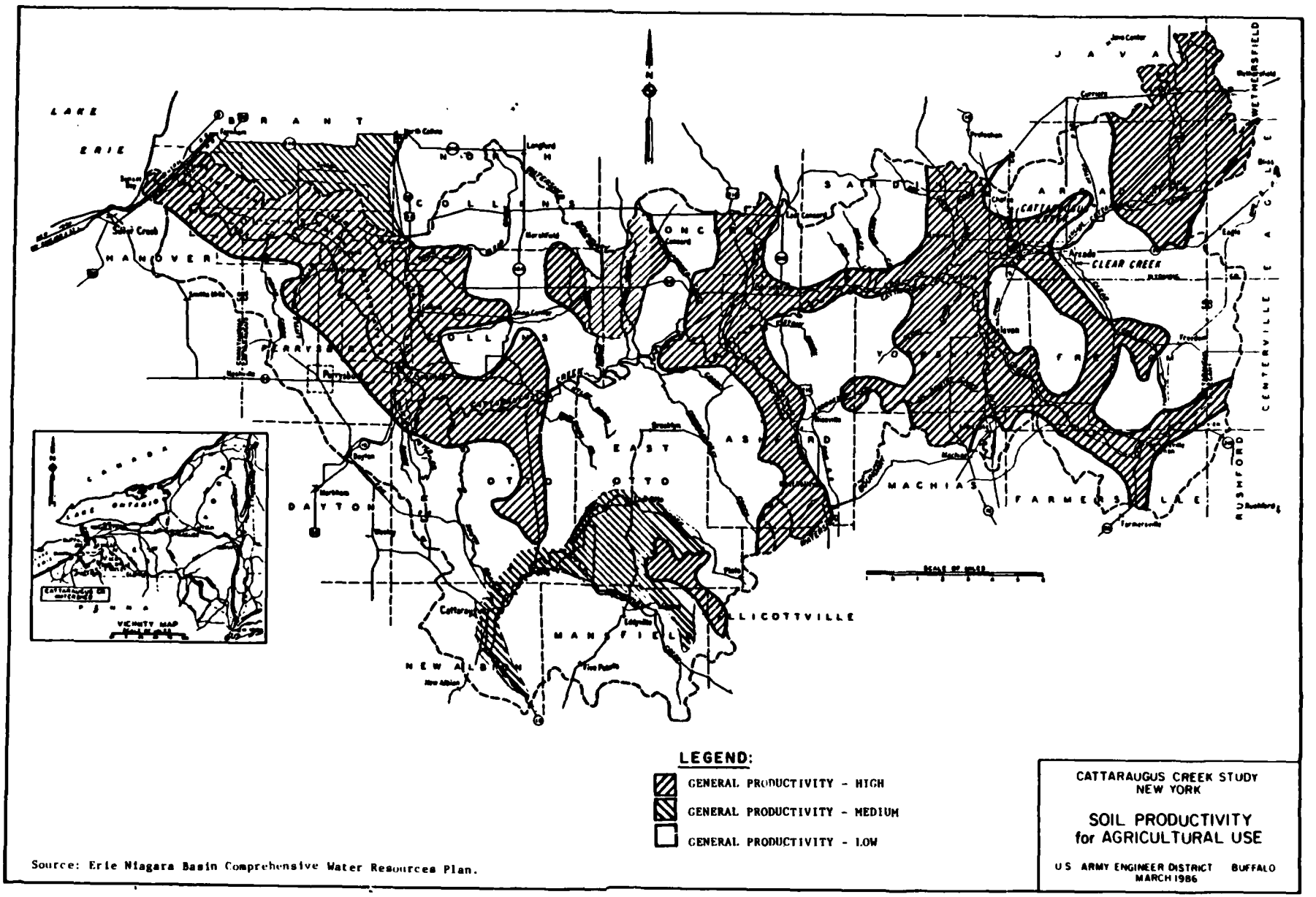
FARMERSVILLE
RUSHFORD
DAYTON
ELLICOTTVILLE
MANSFIELD
NEW ALBION
VICINITY MAP
LEGEND:
More Than 75% Prime Farmland
25% To 75% Prime Farmland
Less Than 25% Prime Farmland
NOTE: Extrapolated approximate boundaries from-
Source: Prime Farmland Of New York State (Map)
August 1977
CATTARAUGUS CREEK STUDY
NEW YORK
PRIME FARMLAND MAP
(N.Y.S. GENERAL)
U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

FIGURE 3



Source: Erie Niagara Basin Comprehensive Water Resources Plan.

FIGURE 4

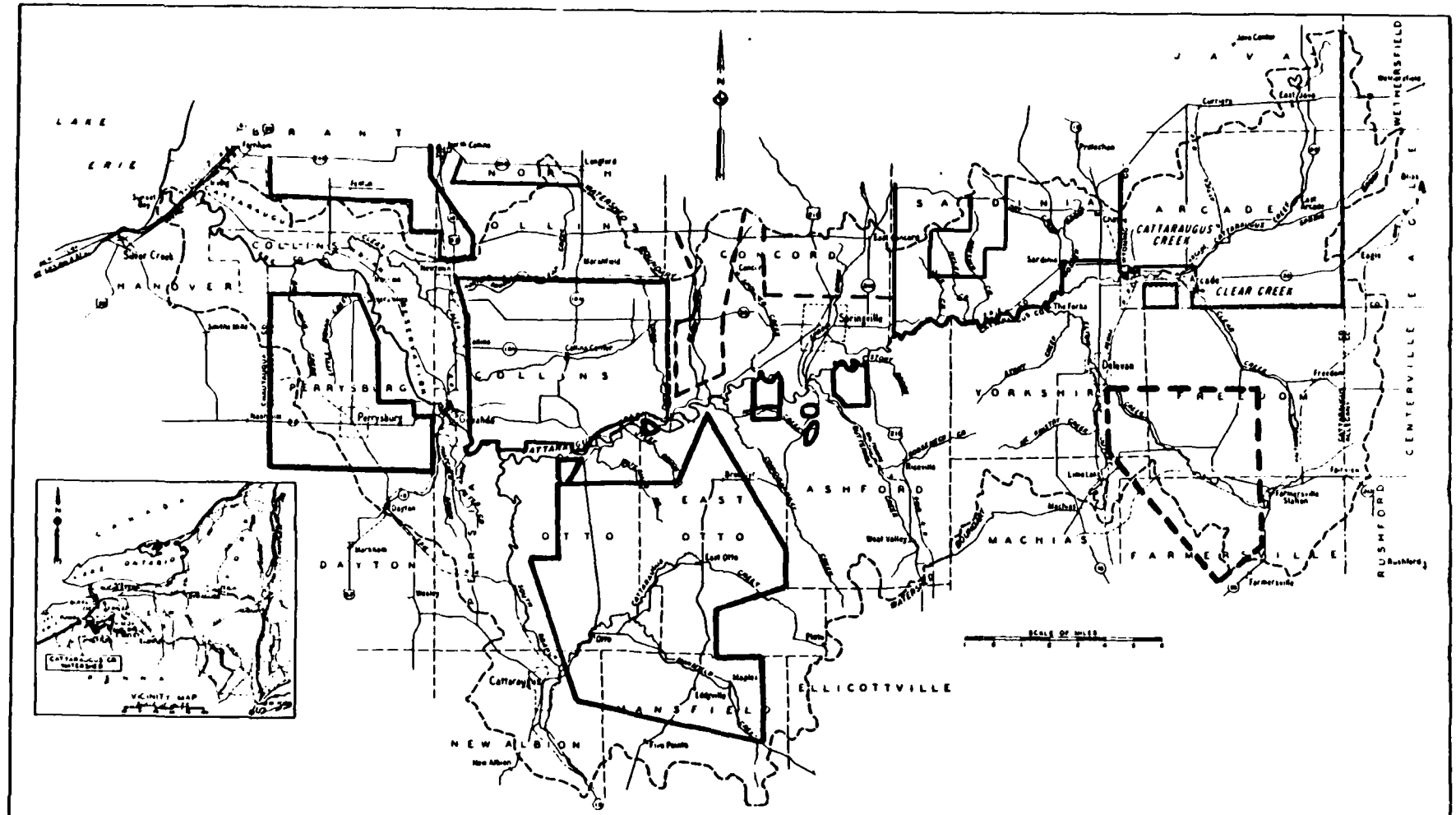

LAKE ERIE
GRANT
NORTH COLLINS
COLLINS
HANOVER
PERRYSBURG
Perrysburg
CONCORD
SARDINIA
ARCADE
CATTARAUGUS CREEK
CLEAR CREEK
JAVA
WETHERSFIELD
CENTERVILLE
YORKSHIRE
FREEDOM
ASHFORD
EAST OTTO
OTTO
MACHIAS
FARMERSVILLE
RUSHFORD
DAYTON
ELLICOTTVILLE
NEW ALBION
VICINITY MAP
SCALE OF MILES
KEY TO SYMBOLS
GENERAL AREA OF AGRICULTURAL DISTRICTS
GENERAL AREA OF PROPOSED AGRICULTURAL DISTRICT
Source: County Agricultural District Maps
LEGEND:
BLUE LINE INDICATES REACH COVERED BY THIS STUDY.
U.S.G.S. WATER-STAGE RECORDING GAGE.
CATTARAUGUS CREEK STUDY
NEW YORK
COUNTY
AGRICULTURAL DISTRICTS
U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

FIGURE 5

ground water supply potential. Figure 6 also identifies communities with municipal water supply systems, and Table 4 identifies source data. The regional population trend is for limited growth to occur. The effect of such growth on existing municipal water supply systems may be negligible. Supply of this resource appears to be good and also expandable. Generally, irrigation is practiced in the region during the normal growing seasons to supplement the average rainfall. The agricultural use of water is tending to increase. The primary sources of this water are from streams and ponds. Very few farmers use well water. A general water quality problem is water hardness.

(b) Sewage Treatment - A number of communities have municipal sewage treatment systems. In the past, effluent discharges from inadequate sewage facilities have affected the water quality in sections of the creek. However, plans are being implemented to improve facilities to accommodate Federal and State effluent standards. Isolated rural developments are utilizing septic systems. Major solid waste land fill areas are also utilized.

(c) Community Services - Social services are administered primarily through the county agencies. Rural law enforcement is administered primarily by the Sheriff's Department and the New York State Police. Local police departments are established where necessary. These law enforcement agencies generally provide services to the major villages and to surrounding townships. Fire districts and school districts are similarly established. Villages and townships generally have their own civil works or highway departments who compliment county and state highway departments. Further development is usually determined by demand, availability of resources and ability of the communities to meet the demands.

(d) Transportation - Figure 7 identifies major transportation routes within the region and in the Cattaraugus Creek Basin. Major roadways which traverse the basin include north-south Route 5, the NYS Thruway Route 90, Routes 62, 219, 240, 16, and 98; east-west Route 249, Genesee Road, Route 438, and Route 39. Several active rail lines also traverse the basin (generally north and south).

(e) Utilities - Major utilities which service the area include Niagara Mohawk, New York State Electric and Gas, National Fuel Gas, and New York Telephone. Springville operates a 500 kilowatt hydro-plant located on the main branch of Cattaraugus Creek just downstream of the village of Springville.

b. Property Values and Tax Revenues.

Based on preliminary data (1983), the average value of farmland (developments included) within the basin ranges from about $600 to $800 per acre, with an average value of about $700 per acre. Community tax revenues are derived through a number of ways, including property and service district taxes, sales taxes and State and Federal revenue sharing.

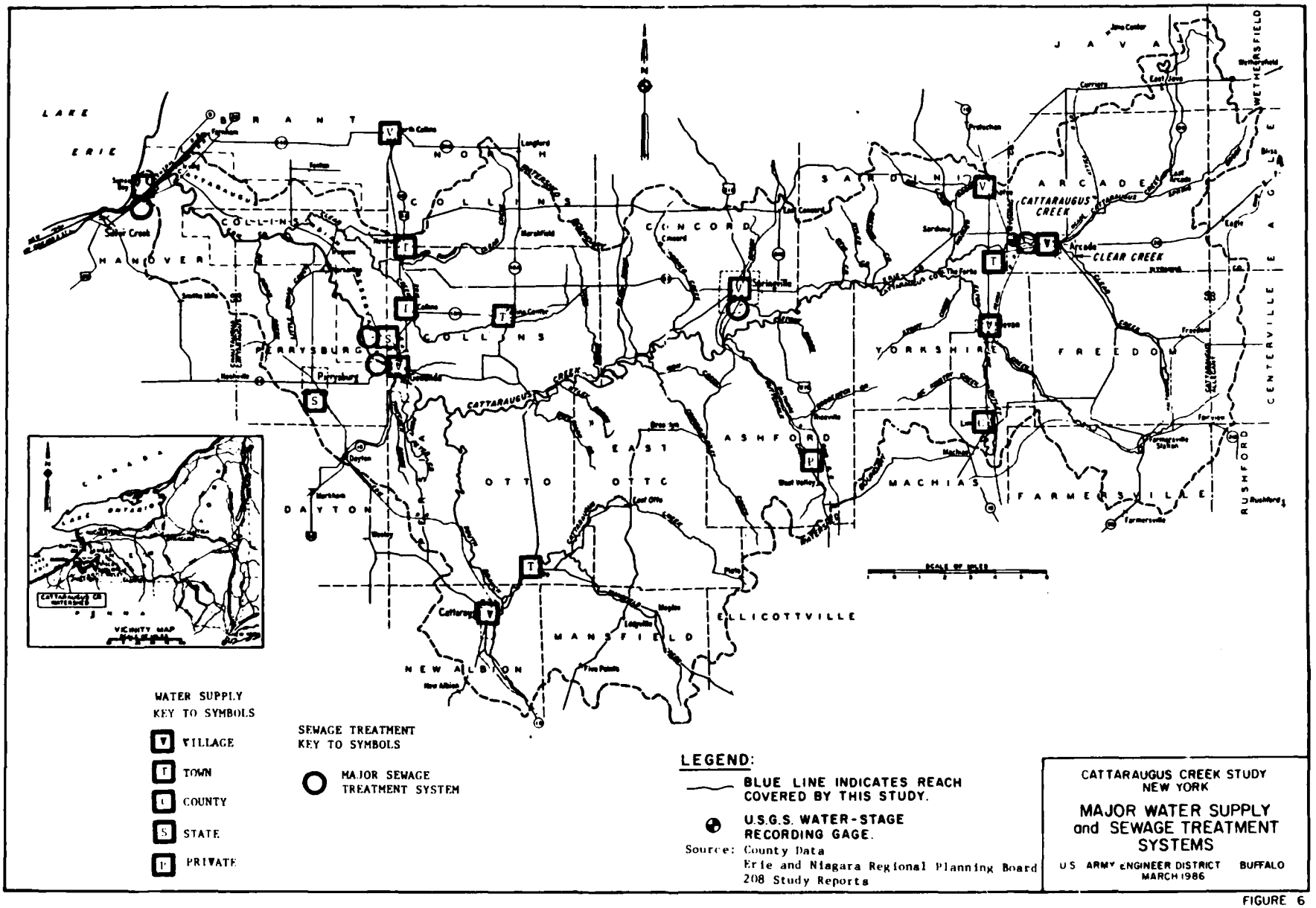

LAKE ERIE
BRANT
COLLINS
HANOVER
PERRYSBURG
CONCORD
SARDINIA
JAVA
ARCADE
CATTARAUGUS CREEK
CLEAR CREEK
YORKSHIRE
FREEDOM
CENTERVILLE
WETHERSFIELD
EAST OTTO
OTTO
ASHFORD
MACHIAS
FARMERSVILLE
RUSHFORD
DAYTON
ELLICOTTVILLE
MANSFIELD
NEW ALBION
WATER SUPPLY
KEY TO SYMBOLS
V VILLAGE
T TOWN
C COUNTY
S STATE
P PRIVATE
SEWAGE TREATMENT
KEY TO SYMBOLS
MAJOR SEWAGE TREATMENT SYSTEM
LEGEND:
BLUE LINE INDICATES REACH COVERED BY THIS STUDY.
U.S.G.S. WATER-STAGE RECORDING GAGE.
Source: County Data
Erie and Niagara Regional Planning Board
208 Study Reports
CATTARAUGUS CREEK STUDY
NEW YORK
MAJOR WATER SUPPLY and SEWAGE TREATMENT SYSTEMS
US ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

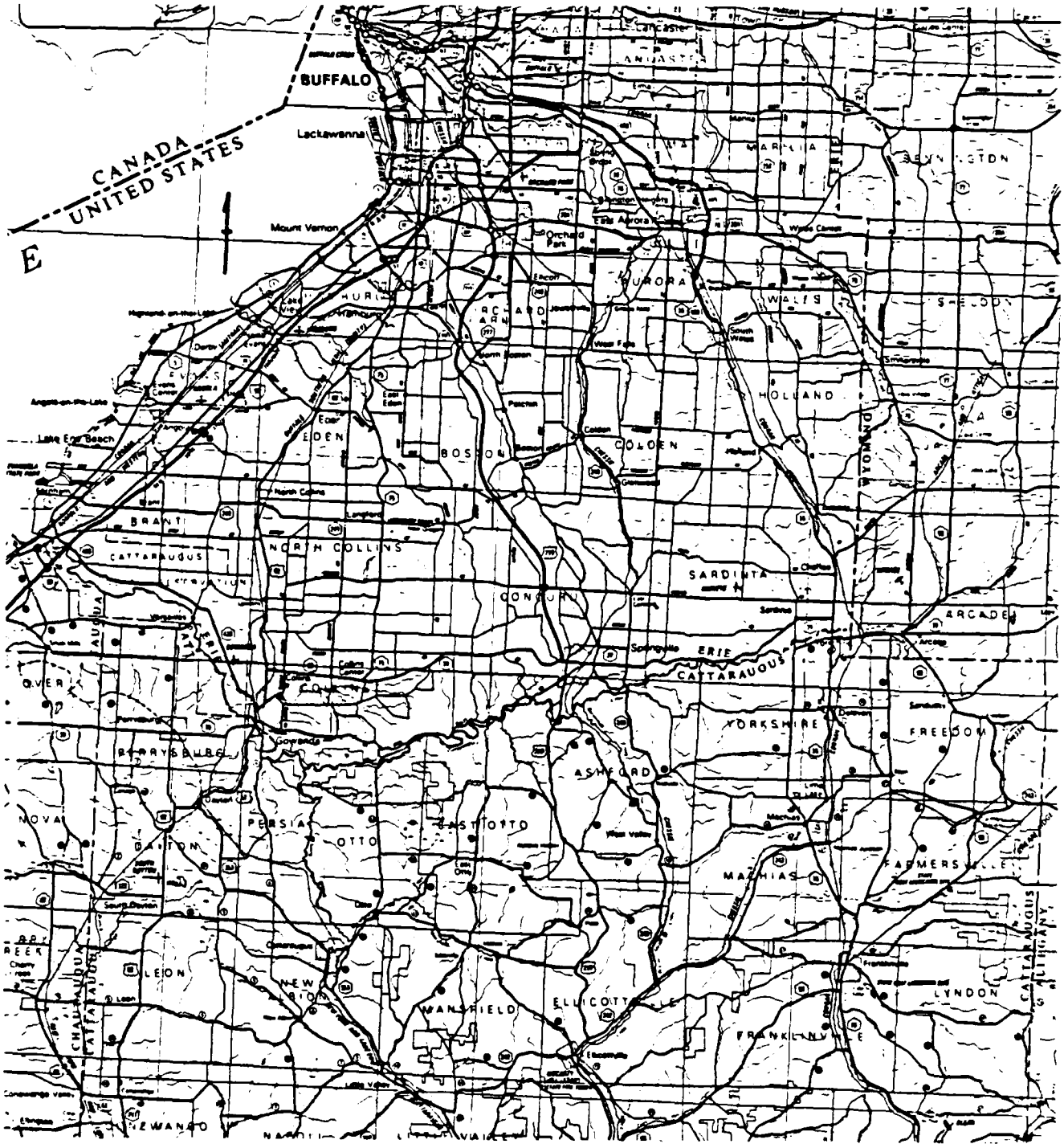
FIGURE 6

Table 4 - Cattaraugus Creek Basin Water Supply
(Primarily Ground Water)

Service Area	Source	Volume (MGD)	Remarks
Gowanda & Vicinity		1.9-2.3	
N. Collins (V)	4 Wells	.13	Wells located outside of village.
Collins #2 (T)	2 Wells	280 g/m	Collins well located on Cattaraugus Indian Reservation.
Collins #3 (T)	1 Well	151 g/m	Well located within Collins Center.
Gownada (V)	Point Peter Creek	.34	Supply in Cattaraugus County.
Gowanda (SH)	Clear Creek (S. Branch)	.31	Creek fed reservoir.
Perrysburg			
Springville & Vicinity	2 Wells	.56-.85	Wells located within village.
Arcade & Vicinity	Well	.42-.73	
Chaffee	1 Well	.10-.15	
West Valley	Well	.04-.07	
Otto Town District	Well	.01	
Cattaraugus (V)	Well	.11-.21	
Delevan (V)	Well	.12-.26	

SOURCE: . Section 208 Areawide Waste Treatment Management and Water Quality Improvement Program Reports. December 1977. Erie and Niagara County Regional Planning Board.

• Erie and Niagara Basin Comprehensive Water Resources Plan NYS Water Resources Commission. December 1969.



SOURCE N.Y.S. ATLAS
N.Y.S. DEPARTMENT OF TRANSPORTATION

CATTARAUGUS CREEK STUDY
NEW YORK

TRANSPORTATION ROUTES

U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

FIGURE 7

c. Noise and Aesthetics.

The predominantly rural agriculturally oriented basin contains a number of scenic vistas. Its variety of terrain containing scattered small communities, farmland, woodland, creeks, and tributaries provides a generally aesthetically pleasing environment for local people and visitors to the basin. Picturesque Zoar Valley with its steep wooded slopes containing hardwood trees, evergreen trees and old abandoned orchards, along with its rolling and flatter bottomlands (including its croplands) is a significant natural resource area to western New York outdoor enthusiasts year-round. The basin displays a variety of fall foliage colors from late September through much of October.

Most noise probably occurs from vehicular traffic along major transportation routes, railroads, and in commercial areas of more developed community centers.

d. Community Cohesion.

Local officials and residents in the basin have identified problems pertaining to scattered areas of erosion along Cattaraugus Creek relative to farmland, residential properties and some public facilities; also, relative to some areas of flooding - particularly in downstream reaches between the mouth of the creek and the village of Gowanda. Local officials and residents have demonstrated significant effort in addressing the problems. Their efforts have also included formation of basin protection committees to try to identify, survey and document problem areas, and to initiate resolutions to some of these problems - including requests for investigations through various Federal and State programs.

With regard to future development, a number of basin residents would probably be adverse to any significant development (i.e. reservoir construction) that could disrupt the existing rural setting and associated dwellings. Many residents are long-time property owners in the basin and would not want to relocate from their property or see their property significantly altered.

e. Cultural Resources.

The New York State Historic Preservation Office (SHPO) has specified to the Corps that numerous known and potential historic sites are located in the Cattaraugus Creek Basin. Since a project site may be archaeologically sensitive, any area selected as an alternative for further consideration would require a cultural resource reconnaissance survey, in order to determine if, in fact, the site does or does not contain significant archaeological resources. Such a survey would be accomplished if the Cattaraugus Creek Study is continued into the feasibility phase of the planning process.

9. NATURAL ENVIRONMENT

a. Air Quality.

The ambient air quality data for the Cattaraugus Creek Basin meets or exceeds the allowable maximum Federal and State standards for the Level I

and Level II classifications for total suspended particulates, sulfur dioxide, carbone monoxide, ozone, nitrogen dioxide, lead, sulfates, and nitrates as indicated by the New York State Department of Environmental Conservation (NYSDEC). Reference the NYSDEC Memorandum on Quarterly Evaluation of Ambient Air Quality and Compliance with Ambient Air Quality Standards. NYSDEC maintains air quality levels as set forth in Part 256, Ambient Air Quality Standards of the Conservation Law. Air quality levels in the vicinity of Springville are classified as being Level II; outside the corporate limits of Springville, the air quality is classified as being Level I. Level I air quality standards are maintained throughout the remaining area of the Cattaraugus Creek Basin. Briefly, the land uses associated with classification Levels I and II are as follows:

Level I - Predominantly used for timber, agricultural crops, dairy farming or recreation. Habitation and industry is sparse.

Level II - Predominantly single and two family residences, small farms, and limited commercial services and industrial development.

b. Water Quality.

NYSDEC was contacted in April 1985 relative to stream water classifications in Cattaraugus Creek. Data obtained from NYSDEC indicated that from the creek's mouth upstream to the Gowanda State Hospital sewage treatment plant outlet pipe, the classification is "B"; from the outlet pipe upstream to the south boundary of the Cattaraugus Indian Reservation the classification is "D"; from the reservation's south boundary upstream to the south boundary of Gowanda Village the classification is "C"; from this south boundary of the village upstream to Elton Creek the classification is "B"; from Elton Creek to its source at Java Lake the classification is "C". A class "B" designation indicates that the stream's best usage in that designated section is for primary contact recreation and any other uses except as a source of the water supply for drinking, culinary or food processing purposes. The classification of "C" indicates that the stream's best usage in that designated section is suitable for fishing and all other uses, except as a source of water supply for drinking; a classification of "D" indicates that the water is suitable for secondary contact recreation, but not conducive to propogation of game fish. From the aforementioned classifications provided, the water in Cattaraugus Creek varies in quality to some degree in different stretches of the creek. However, the ambient conditions for dissolved oxygen, fecal coliforms, and dissolved solids appear to remain within the acceptable standards for the stream classifications described.

c. Fish, Wildlife, and Upland Vegetation Resources.

Information received from the NYSDEC indicated that Cattaraugus Creek is New York's largest and most important salmonid fishery tributary to Lake Erie. This system contains the highest mileage of trout water as well as the best quality streams in the Erie-Niagara Drainage Basin. During the fall, large concentrations of coho and chinook salmon migrate from Lake Erie into the creek (late August-December) to spawn. Also, in the fall as well as between late February and April, steelhead trout migrate into the creek.

Both trout and salmon make migration runs up to the Springville Dam barrier. NYSDEC also stocks Cattaraugus Creek with salmonids. A chart provided by NYSDEC entitled "Summary of Salmonid stocking in New York waters of Lake Erie During 1984 and Projected Levels for 1985" revealed that salmonid species stocked include coho salmon (spring yearlings), chinook salmon (spring fingerlings), rainbow trout (fall fingerlings), steelhead trout (spring yearlings), and brown trout (spring yearlings). Additionally, there are a number of streams in the basin where trout spawn successfully; thereby contributing young salmonids to the coldwater fishery population. Gooseneck Creek, Buttermilk Creek, Stony Brook, and Spooner Creek are among the creeks utilized for spawning by trout. Stony Brook also supports a native rainbow trout population (Ref. personnal communication with the U.S. Fish and Wildlife Service).

Populations of warm-water fish are also found in the creek. Included are such species as yellow perch, common shiner, sunfish, carp, smallmouth bass, and walleye. According to a publication entitled "Spawning and Nursery Areas of Great Lakes Fishes" (U.S. Fish and Wildlife Service, 1982), smallmouth bass spawn around early June and young of the year are found in late summer. Also, there is a seasonal walleye fishery at the mouth of Cattaraugus Creek - the creek's mouth is one of the most important spawning areas in New York waters. The publication also indicated that sea lamprey and carp also use the creek as a spawning stream. Sea lamprey spawn up to the Springville Dam barrier.

The Cattaraugus Creek Basin also contains a diversity of habitat for both game and non-game wildlife. Such habitat includes openland, woodland, wetland, pastureland, cropland and idleland. Riparian areas adjoin the main stream of the creek and its tributaries. Wildlife inhabiting the watershed include whitetail deer, red fox, woodchuck, skunk, opossum, raccoon, grey and red squirrel, cottontail rabbit, weasel, mink, muskrat, beaver and a variety of mice, voles and moles, in addition to a diversity of amphibians and reptiles. Many species of songbirds as well as raptors and game birds such as turkey, ruffed grouse, and woodcock utilize habitat in the basin for nesting and rearing their young.

Coordination with NYSDEC, Delmar, New York office revealed that there are a number of known significant natural resource areas in the basin. The diversity of the natural resource areas of importance within the basin, ranges from coldwater sources for some of the creek, to wild trout spawning habitat, waterfowl habitat, deer wintering areas, locations containing unique bog vegetation and geologic formations, woodcock and grouse habitat, and a significant raptor (birds of prey) observation site.

There is a diversity of woody and herbaceous vegetation in the basin. This diversity is influenced to some degree by the different land use types - such as croplands containing corn, oats, millet, and barley. Managed grasslands are planted to long term hay containing timothy, alfalfa, birdsfoot trefoil, and clover. Abandoned idle farmlands and hedgerows are often well established with herbaceous weed plants and shrubs. The herbaceous plants consist of a diverse mixture of forbs and grasses of varying heights that provide wildlife food and cover. A number of pasturelands and abandoned fields also contain scattered trees and shrubs.

With regard to woody plant species, the basin is essentially within the Northern Hardwood Ecological region. All of its forest land has been cut-over one or more times. The present stand of trees consists of second growth hardwoods that contain both saw timber and pole-sized timber, with scattered natural establishments of coniferous trees. Some of the natural tree species found include tulip poplar, basswood, beech, cherry, yellow birch, sugar and red maple, oak, aspen, cottonwood, hemlock, serviceberry, white pine, black-willow, and ironwood. A variety of shrubs and vines are also scattered along field and woodland peripheries as well as to some degree within the woodland understory - included are chokecherry, dogwood, witch-hazel, sumac, hawthorn, blackberry, raspberry, viburnum, elderberry, barberry, gooseberry wild grape, and virginia creeper. Non-woody plants also inhabit terrestrial woodlands below the shrub level. Violets, gill-over-the-ground, pennwort, trilium, spring beauty, jack-in-the-pulpit, and blue cohosh are among the many different species of plants found.

Wet and damp soil areas in the basin vary in kind and amount of plant diversity. Persistent and non-persistent vegetation, as well as floating and submergent plants are often found in such areas. Cattail, reedgrass, bulrush, smartweed, sedge, arrowhead, rice cutgrass, duckweed, waterlily, bladderwort, coontail, waterweed, milfoil, coltsfoot, horsetail, sensitive fern, alder, and buttonbush are among the species of aquatic-type plants ingabiting inundated or damp soil areas. The following section on wetlands provides some insight into the variety of wetland types found within the Cattaraugus Creek Basin in the vicinity of the main stem and South Branch of Cattaraugus Creek and Mansfield Creek.

d. Wetlands.

There are a number of scattered wetlands within the broad area of the Cattaraugus Creek Basin. These wetlands have value as songbird, waterfowl, and aquatic fur-bearing animal habitat, and they also provide wintering and escape cover habitat to a variety of upland wildlife. Some idea of wetland types to be found in the basin were extracted from wetland map overlays prepared by NYSDEC for use with topographic maps, and from wetland maps prepared by the U.S. Fish and Wildlife Servie (FWS). The following is a general overview of the variety of wetland types in the vicinity of Cattaraugus Creek (main stem and South Branch) and in the vicinity of Mansfield Creek within the basin (Note: Depending on the alternative plan considered, these wetlands may or may not be impacted to some degree by a Corps action):

(1) Wetland Cover Types from NYSDEC Overlay Maps (the dominant cover type is indicated first) - Flooded live deciduous trees with mixed flooded shrubs; flooded shrubs; flooded live deciduous trees; flooded live conifers; flooded live deciduous trees mixed with flooded conifers; flooded live conifers with mixed live deciduous trees; wet meadow with flooded shrubs; flooded shrubs with wet meadow; flooded shrubs with mixed flooded live deciduous trees; flooded shrubs mixed with open water; flooded shrubs mixed with emergent plants; emergent plants with mixed flooded shrubs; flooded shrubs with mixed flooded conifers; linear wetlands (less than 100' wide but greater than 25' wide); wet meadow; emergent plants with open water; open water with wet meadow; open water with mixed floating vegetation; emergent plants;

floating vegetation; emergent plants mixed with open water; floating vegetation mixed with open water; flooded dead trees with mixed floating vegetation; lakes.

(2) Wetland Cover Types from FWS Maps - Palustrine broad-leaved deciduous scrub/shrub emergent persistent narrow-leaved wetland; Palustrine open-water wetland intermittently exposed/permenent; Palustrine broad-leaved deciduous forested wetland seasonally saturated; Palustrine open water wetland intermittently exposed/permanent/excavated; Palustrine broad-leaved deciduous forested wetland seasonally flooded; Palustrine forested broad-leaved deciduous forested wetland seasonally flooded; Palustrine forested broad-leaved deciduous scrub-shrub wetland, seasonally flooded; Palustrine narrow-leaved persisten emergent wetland, Palustrine broad-leaved deciduous forested wetland with a temporary water regime; Palustrine intermittently exposed permanent diked wetland; Riverine lower perennial wetland with permanent open water; Riverine lower perennial unconsolidated shoreline, with a temporary water regine; Riverine upper perennial unconsolidated shoreline with an intermittently flooded water regime; Riverine upper perennial unconsolidated shoreline with a temporary water regime.

SECTION III
PROBLEM IDENTIFICATION

The purpose of this section is to inform the reader of the water and related resource problems and needs in the study area and for which this study seeks a solution. The section discusses the need to reduce flood damages in the Cattaraugus Creek Basin; reviews the planning constraint under which this study was conducted; discusses the specific planning objectives of the study; and reviews the conditions that would exist if no Federal action was taken.

10. PROBLEMS AND NEEDS

a. Flood Damages.

Flooding in the Cattaraugus Creek Basin is both a severe and persistent problem. For example, Sunset Bay, at the mouth of Cattaraugus Creek, experiences flooding almost annually. This flood problem is primarily a result of ice jamming the mouth of the creek, thus preventing flood waters from entering Lake Erie. The most recent flood event at this location occurred on 19 and 20 January 1986 and caused flood damages in excess of $1,000,000. Flooding also occurs in the villages of Gowanda and Arcade. Further, spring floods cause significant agricultural damages, especially downstream of the village of Springville.

Due to the severe nature of the flood problem, one of the first steps in this reconnaissance study was to establish the location and extent of flooding in the Cattaraugus Creek Basin. In this endeavor, past reports for the area, especially "Appendix 14, Flood Plains - Great Lakes Basin Framework Study," 1975 and the February 1976 General Design Memorandum for Cattaraugus Creek Harbor, were extensively used. This information was supplemented by field visits and interviews with local residents. The results of this investigation are presented in Table 5. As indicated, existing average annual flood damages in the Cattaraugus Creek Basin total about $150,200 without consideration of ice jam flooding at the mouth of the creek and $353,200 including damages from ice jam flooding.

(NOTE: Construction of the Cattaraugus Creek Small-Boat Harbor at the mouth of Cattaraugus Creek in 1983 was expected, among other things, to reduce damages from ice jam flooding at the creek mouth. However, recent flood events indicate that the project may have, in fact, actually increased the potential for ice jam flooding. The Buffalo District is presently conducting a Design Deficiency Study to determine if the project has aggravated flooding at the mouth of the creek and, if so, what measures would be required to reduce flood damages to preproject conditions. To avoid duplication of effort, no consideration was given to this aspect in this reconnaissance study. Further, all damage estimates for ice jam flooding at the mouth of the creek stated in this report and plans developed to alleviate these damages assume preproject conditions.)

Table 5 - Estimated Existing Average Annual Flood Damages in the Cattaraugus Creek Basin
(October 1985 Price Levels)

Location	Estimated Existing Average Annual Damages							
	Without Ice				With Ice			
	Residential ($/yr)	Industrial ($/yr)	Agricultural ($/yr)	Total ($/yr)	Residential ($/yr)	Industrial ($/yr)	Agricultural ($/yr)	Total ($/yr)
Mouth to Village of Springville	42,000	0	62,400	104,400	42,000	0	62,400	104,400
Sunset Bay	16,000	0	0	16,000	219,000	0	0	219,000
Gowanda	9,300	1,000	0	10,300	9,300	1,000	0	10,300
Arcade	16,000	0	0	16,000	16,000	0	0	16,000
South Branch	3,500	0	Not Estimated	3,500	3,500	0	Not Estimated	3,500
TOTAL	86,800	1,000	62,400	150,200	289,800	1,000	62,400	353,200

b. Electrical Power Demand.

A report of the Planning Committee of the New York Power Pool entitled "New York Power Pool Long Range Plan: Electric Supply and Demand, 1985-2001," April 1976, states that the New York State Power Pool will have to add 3,189 megawatts of new generating capacity to meet expected increased electrical power demand in the time interval, 1985-2001. Further, the smallest planned individual expansion project to meet this increased demand is 300 megawatts (300,000 kilowatts). However, as will be discussed in subsequent sections of this report, the largest hydroelectric power generating facilities being considered as an add-on feature to the basic dam/reservoir plans for flood control will only add 15,400 kilowatts of installed capacity. Thus, it is highly unlikely that construction of such a facility would defer construction of any new planned electrical generating facilities. Rather, a more likely scenario is that the proposed hydroelectric project would displace the more expensive oil or gas-fired generating facilities presently in the system which make up a significant portion of the system's generating capability (about 35-percent in 1985). Therefore, although hydroelectric power generating facilities will be considered as an add-on feature of the basic dam/reservoir plans for flood control, they are expected to have only negligible effects in meeting the future increased demand for electrical power in New York State.

c. Recreation.

Based on past studies conducted by New York State and the significant growth in attendance at Corps facilities nationwide, demand for water-based recreation is increasing. This increasing demand is due to population growth and increased income and leisure time. Recreational boating and fishing are two of the categories that have the highest growth potential. In addition, the demand for whitewater rafting/boating, which presently occurs in Zoar Valley just downstream of Springville, is expected to grow significantly in the years ahead. Based on the above, recreation facilities to meet the increasing demand for recreational boating, fishing, and whitewater rafting/boating were included as add-on features to the basic dam/reservoir plans for flood control considered in this reconnaissance study.

d. Other Water Resources Problems not Considered.

Several other water resources problems in the Cattaraugus Creek Basin were considered in this reconnaissance study, but were not pursued further. The rationale for not pursuing these water resources problems further is as follows:

(1) Commercial Navigation - Cattaraugus Creek is not accessible to commercial shipping vessels nor has any need been expressed to modify the creek to accommodate such vessels. Thus, there is no need to study this aspect under the Cattaraugus Creek Study.

(2) Water Supply - The majority of the towns and villages in the Cattaraugus Creek Basin depend on groundwater sources, with their accompanying well fields, to meet their water supply needs. As part of this

reconnaissance study, an analysis was made to determine the demand for water supply over the next 50 years and the ability of the existing systems to meet this future demand. The analysis indicated the following: (a) only two communities (Otto and Chaffee) require new facilities to meet future water supply needs; and (b) the most efficient method to meet this future demand is to install new wells (one - 100,000-gallon per day well at each location). Since construction of new wells is a non-Federal responsibility, no further consideration was given to this aspect under the Cattaraugus Creek Study.

(3) Streambank Erosion - Streambank erosion is a severe problem in the Cattaraugus Creek Basin and is a major concern of local residents. However, the Corps of Engineers does not have the authority to construct single-purpose streambank erosion control projects except for small, emergency projects to protect public facilities under the Corps Small Projects Program. Thus, no further consideration was given to this aspect under the Cattaraugus Creek Study.

(4) Water Quality - As previously stated, water in Cattaraugus Creek varies in quality to some degree in different stretches of the creek. However, the Environmental Protection Agency has issued nationwide discharge standards with the express purpose of establishing and maintaining the highest practical water quality in the effected streams. Therefore, to avoid duplication of effort, no further consideration was given to this aspect under the Cattaraugus Creek Study.

11. PLANNING CONSTRAINT

The Cattaraugus Reservation of the Seneca Nation of New York Indians occupies the north or right bank of Cattaraugus Creek from its mouth to mile 16.7 at the town of Perrysburg (see Figure 2) and on the left or south bank from mile 2.5 at the town of Hanover to mile 16.4. In the past, the Seneca Nation has been very reluctant to sell or lease reservation land for Federal projects. Therefore, throughout the course of this study, every attempt was made to situate alternative plans under consideration off reservation land. In the one case where this was not possible, adverse impacts were kept to a minimum.

12. NATIONAL OBJECTIVE

Current Federal policy, as developed by the President's Water Resources Council, requires that alternative water and related resource plans be formulated in accordance with the national objective of National Economic Development (NED). National Economic Development is achieved by increasing the value of the nation's output of goods and services and improving economic efficiency consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Therefore, in accordance with the guidance established in Engineering Regulation 1105-2-30, "General Planning Principles," dated 18 October 1985, this study was consistent with the planning requirements of the Water Resources Council "Principles and Guidelines" (P&G) and related policies.

13. SPECIFIC PLANNING OBJECTIVES

Specific planning objectives are the national, State, and local water and related land resources management needs (opportunities and problems) specific to a study area that can be addressed to enhance National Economic Development. Based on a review of the authorizing legislation for the Cattaraugus Creek Study, previous reports for the area, statements by individuals in the private sector, input from officials at many levels of Government, and an analysis of the problems and needs of the study area, as discussed previously, the specific planning objectives for this Reconnaissance Report that have been identified are as follows:

a. Enhance National Economic Development by reducing flood damages in the Cattaraugus Creek Basin.

b. Promote the region's ability to meet its need for inexpensive electrical power.

c. Promote the region's ability to meet its unfulfilled needs for additional recreational boating, fishing, and whitewater rafting/boating facilities.

d. Insure that proposed plans minimize, to the fullest extent possible, adverse impacts to the Seneca Nation of New York Indians Reservation lands.

14. CONDITIONS IF NO FEDERAL ACTION TAKEN (WITHOUT PROJECT CONDITIONS)

In any formulation, there is always the basic question . . . "Is there a justified need for change?" Therefore, the conditions that would exist if no Federal action were taken was investigated for this study. Besides answering the basic question, these conditions will also provide a common basis for comparing alternative plans of improvement.

As a result of no action, flooding in the Cattaraugus Creek Basin would continue, with average annual damages totaling about $353,200. However, since no new development in the flood plain is projected for the basin due to the severe flood problem, flood damages should not increase. As a result of no Federal action, the trauma and inconvenience experienced by flood victims in the basin would also continue. Further, the opportunity to reduce the cost of electricity in the basin would be foregone. In addition, demand for additional recreational boating, fishing, and whitewater rafting/boating facilities would not be met.

SECTION IV
FORMULATION OF PRELIMINARY ALTERNATIVE PLANS

This section of the Reconnaissance Report provides: a brief review of alternative plans addressed in previous studies and their applicability to this current reconnaissance study; discusses the formulation methodology used in this reconnaissance study; and discusses the development of preliminary alternative plans.

15. PLAN FORMULATION RATIONALE

a. Alternative Plans Addressed in Previous Studies.

Past studies for the Cattaraugus Creek Basin which are of particular concern to this current reconnaissance study include the 1966 Preliminary Feasibility Report for the village of Gowanda, the 1969 Appalachia Report and the 1983 Section 205 Reconnaissance Report for the Cattaraugus Indian Reservation. The 1966 Preliminary Feasibility Report (PFR) investigated, among other things, the feasibility of reducing flood damages along Thatcher Brook at its confluence with Cattaraugus Creek in the village of Gowanda. However, the plan was not economically justified (benefit-to-cost ratio of 0.14) and was dropped from further consideration. Further, as no significant new development has occurred in the flood plain since that date that would change the results of the previous economic analysis, there was no need to reexamine flood control plans in the Thatcher Brook area in this reconnaissance study.

The 1966 PFR and the subsequent 1969 Appalachia Report also recommended further study of a local protection project along Cattaraugus Creek in the village of Gowanda to protect two industries. However, the recommendation was predicated on benefits for "prevention of economic loss" which changed the benefit-to-cost ratio of the plan from 0.57, based on flood damage reduction benefits only, to 11.1. These "prevention of economic loss" benefits were a special type of benefit applicable to the Appalachia Study only, and measured the economic loss that would occur if the industries relocated out of the region after sustaining severe flood damages. This benefit category, however, was never accepted, thus, the benefit-to-cost ratio of the plan dropped to 0.57. Further, since 1969, one of the industries shut down their operations and the other industry built a flood wall that provides protection up to the 100-year flood event. Thus, since flood damages along Cattaraugus Creek in the village of Gowanda are now minor, there is no need to reexamine flood damage reduction plans for this area in this reconnaissance study.

The 1969 Appalachia Report also recommended further study of three dam/reservoir projects in the interest of flood control, hydropower, and recreation. These projects were located at Otto on the South Branch of Cattaraugus Creek and at Zoar Valley and Springville on the main stem. However, the proposed dam/reservoir project at Otto would significantly disrupt spawning habitat; cause extensive disruption to a large acreage of significant wetland resources; would have significant adverse impacts on

existing land use and residential property owners; and is intensely opposed by area residents. The proposed Zoar Valley dam/reservoir project would cause disruption to an area of identified State and national natural, aesthetic and recreational significance; would have significant adverse impact on salmonid-run fisheries habitat; would have significant adverse impact on existing land use and residential property owners; and is also opposed by local interests. The Springville dam/reservoir project, on the other hand, avoids disruption to salmonid resources; avoids major disruption of significant wildlife habitat; and is not opposed by local interests. Therefore, based on the above, only the Springville dam/reservoir project was considered further in this reconnaissance study and the Otto and Zoar Valley dam/reservoir projects were dropped from further consideration.

The 1983 Section 205 Reconnaissance Report for the Cattaraugus Indian Reservation stated that local interests implemented a plan that alleviated their flood problem. Thus, there is no need to investigate this aspect further in this reconnaissance study.

b. Reconnaissance Phase Analysis.

The objective of this reconnaissance phase is to formulate and assess plans to reduce flood damages and allied purposes in the Cattaraugus Creek Basin with a view towards determining if such plans warrant further, detailed analysis in the feasibility phase of the study. Plans are formulated based on physical constraints, the desires and preferences of local interests and being consistent with sound engineering, economic, and environmental principles. In this process, an iterative procedure that provided for increased levels of refinement in design and critique and evaluation by principal study participants was used to narrow the range of alternatives to carry forward. The procedure also allows for review and comment by the general public at informal meetings, workshops, and public meetings. Investigation of other water resource problems, such as water quality, water supply and streambank erosion was limited to a level of refinement necessary to adequately assess potential impacts on each by proposed modification plans.

16. GENERAL FORMULATION AND EVALUATION CRITERIA

Federal policy on multiobjective planning, derived from both legislative and executive authorities, establishes and defines the national objective for water resources planning, specifies the range of impacts that must be assessed, and sets forth the conditions and criteria which must be applied when evaluating plans. Plans must be formulated to meet the needs of the area with due regard to benefits and costs, both tangible and intangible and effects on the ecology and social well-being of the community.

The formulation of a plan, including the screening of alternatives, must of necessity be within the context of an appropriate framework and set of criteria. The planning framework is established in the Water Resources Council's "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," which requires the systematic preparation and evaluation of alternative solutions to problems, under the objective of National Economic Development (NED). The process also requires

that the impacts of a proposed action be measured and the results displayed or accounted for in terms of contributions to four accounts: NED, Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE). The formulation process must be conducted without bias as to structural and nonstructural measures.

Within the structure of the overall planning framework other more specific criteria relative to general policies, technical engineering, economic principles, social and environmental values, and local conditions must be established. These criteria, noted as "Technical," "Economic,"" and "Socioeconomic and Environmental" are as follows:

a. Technical Criteria.

(1) Assume for this reconnaissance study that sideslopes of 2.5:1 are adequate for functional design of levees, berms, and riprapped creek banks.

(2) For levee plans considered, assume that : (a) an acceptable borrow area that contains suitable semi-impervious material is within a 10-mile radius of the construction site; (b) foundation material at the proposed levee site will not present underseepage problems; (c) no consideration will be given to internal drainage; and (d) no consideration will be given to diverting overland flow originating outside the site. These facets will be investigated in detail during the feasibility phase of the study, if levee plans are carried forward.

b. Economic Criteria.

(1) Tangible benefits should exceed project economic costs.

(2) Each separable unit of improvement or purpose should provide benefits at least equal to its cost unless justifiable on a noneconomic basis.

(3) Each plan, as ultimately formulated, should provide the maximum net benefits possible within the formulation framework.

(4) The costs for preliminary alternative plans of development should be based on preliminary layouts, estimates of quantities, and October 1985 unit prices.

(5) The benefits and costs should be in comparable economic terms to the fullest extent possible.

(6) A 50-year economic life and 8-5/8 percent interest rate are used for the economic evaluation of local protection plans and a 100-year economic life and 8-5/8 percent interest rate are used for the economic evaluation of dam/reservoir plans.

(7) The project evaluation period for local protection plans is a 50-year interval and for dam/reservoir plans is a 100-year interval beyond the estimated implementation date of 1995.

(8) The base case for comparison of alternative plans is the do-nothing ("no-action") plan.

(9) Average annual damages for ice jam flooding at the mouth of Cattaraugus Creek are assumed to be the same as those that existed prior to construction of the small-boat harbor.

c. Socioeconomic and Environmental Criteria.

The criteria for socioeconomic and environmental considerations in water resources planning are prescribed by the National Environmental Policy Act of 1969 (PL 91-190) and Section 122 of the River and Harbor Act of 1970, (PL 91-611). These criteria prescribe that all significant adverse and beneficial economic, social, and environmental effects of planned developments be considered and evaluated during plan formulation.

d. Design and Other Considerations.

(1) The procedures and data presented in the report entitled "Hydropower Cost Estimating Manual" (May 1979) prepared by the Portland District, Corps of Engineers, will be used to size and cost hydroelectric power generating facilities considered as an add-on feature to the basic dam/reservoir projects for flood control at Springville. These facets will be addressed in greater detail during the feasibility phase of the study if dam/reservoir plans are carried forward.

(2) Mitigation - There is insufficient environmental data at this time to determine the precise need for mitigation or the type of mitigation that might be required. Therefore, plans and associated costs for mitigation are not included in the estimates for this Reconnaissance Report. Mitigation will be evaluated in the feasibility phase, as appropriate.

(3) Cost Sharing - The Secretary of the Army is reviewing project cost-sharing and financing across the entire spectrum of water resources development functions. The basic principle governing the development of specific cost-sharing policies is that whenever possible, the cost of services produced by water projects should be paid for by their direct beneficiaries. Although only the traditional cost-sharing is presented here, the reader should be aware that other ratios may be required by the Secretary of the Army before approving construction.

(a) Local Protection (Structural) - Federal responsibilities include 100 percent of the construction costs for the flood control project. Non-Federal interests are required to provide all lands, easements, and rights-of-way; relocate all utilities; and maintain the completed project.

(b) Major Reservoirs - Federal responsibilities include 100 percent of the construction costs (including lands, easements, rights-of-way, and utility relocations) for the flood control project. The Federal Government would also operate and maintain the project.

(c) Recreation at Major Reservoirs - Federal responsibilities include 100 percent of the joint construction costs (including lands, easements, rights-of-way, and utility relocations) and 50 percent of the construction costs of separable project features. The Federal Government would also maintain the joint features of the project. Non-Federal interests are responsible for providing 50 percent of the construction costs of separable project features; providing all lands, easements, and rights-of-way for the separable project features; relocating all utilities associated with the separable project features; and operating and maintaining the separable project features.

(d) Hydroelectric Power - Local interests are required to repay 100 percent of the construction costs of the joint and separable project features and operate and maintain the completed project or reimburse the Federal Government for such costs.

(4) Local Sponsor - Formal assurances of local cooperation must be furnished by a municipality or other public agency fully authorized under State laws to give such assurances and financially capable of fulfilling all items of local cooperation. The New York State Department of Environmental Conservation is the local sponsor for Corps-built flood control projects in New York State. Continual coordination will be maintained with the State during the feasibility phase.

17. DEVELOPMENT OF PRELIMINARY ALTERNATIVE PLANS (POSSIBLE SOLUTIONS)

Within the prescribed planning framework and established criteria, possible solutions were identified and will be evaluated in a two-stage iterative process to address the needs of the study area and the overall planning objectives. Each stage includes the four functional planning tasks of problem identification, formulation of alternatives, impact assessment and evaluation. Each stage contains essentially the same sequence of tasks but emphasis shifts as the process proceeds.

This document reports the results of the reconnaissance phase evaluation. The level of study performed is consistent with the reconnaissance phase objective of evaluating a broad range of possible solutions and identifying the best general plan (or plans) for satisfying the flood control needs of the Cattaraugus Creek Basin.

The primary water resources need for which a solution is sought under this authority is to reduce flood damages in the Cattaraugus Creek Basin. As possible solutions to addressing this need, 9 preliminary alternatives, in addition to the "no action" option, were formulated and assessed. These alternatives fall into two broad catagories: local protection plans in areas where a high concentration of flood damages exist (Sunset Bay and Arcade); and dam/reservoir plans at Springville. In addition, for the dam/reservoir plans developed at Springville, hydroelectric power generating facilities and recreation facilities were also considered to maximize the economic efficiency of the basic flood control plans. A description and evaluation of each individual plan is presented in the next section of the Main Report, "Assessment, Evaluation, and Comparison of Preliminary Plans."

SECTION V

ASSESSMENT, EVALUATION, AND COMPARISON OF PRELIMINARY PLANS

This section provides, in summary form, a description of the nine preliminary plans formulated to reduce flood damages and allied purposes in the Cattaraugus Creek Basin, and compares their economic and environmental impacts. The basis of comparison is the "No-Action" (do-nothing) plan. The section also discusses the rationale for selecting preliminary plans for further, detailed study in the feasibility phase of the study and the rationale for eliminating preliminary plans from further consideration.

18. ASSESSMENT, EVALUATION AND COMPARISON OF PRELIMINARY ALTERNATIVE PLANS

Table 6, following, provides a brief description of the nine preliminary plans formulated to reduce flood damages and allied purposes in the Cattaraugus Creek Basin along with their estimated costs. The table also compares the economic and environmental impacts of these nine plans. The basis of comparison is the "No-Action" (do-nothing) Plan.

19. RATIONALE FOR SELECTING PLANS FOR FURTHER DETAILED STUDY (PLANS 3A, 3B, AND 4)

The primary consideration used in selecting those plans to carry forward into the feasibility phase of the study is economic efficiency. As such, only those plans that have benefit-to-cost ratios greater than 1.0 will be carried forward. These plans are Plans 3A and 3B with benefit/cost ratios of 4.2 and 2.8, respectively. In addition, the "No-Action" Plan (Plan 4) will also be carried forward as the basis of comparison.

20. RATIONALE FOR ELIMINATING PLANS FROM FURTHER CONSIDERATION (PLANS 1A, 1B, 1C, 1D, 1E, 1F, AND 2)

The primary consideration used in selecting those plans to eliminate from further consideration is economic efficiency. As such, all plans with benefit-to-cost ratios less than 1.0 will be dropped from further consideration. These plans are Plans 1A, 1B, 1C, 1D, 1E, 1F, and 2 with benefit/cost ratios of 0.5, 0.5, 0.4, 0.5, 0.5, 0.4 and in the range of 0.1 to 0.3, respectively.

Table 6 - Assessment, Evaluation, and Comparison of Preliminary Alternative Plans

Item	Plan 1A (100-Foot High Dam - See Plate 1)	Plan 1B (150-Foot High Dam - See Plate 2)	Plan 1C (200-Foot High Dam - See Plate 3)	Plan 1D (100-Foot High Dam, Modify Existing Powerhouse - See Plate 1)
1. Plan Description	Plan 1A consists of construction of a 100-foot high roller-compacted concrete dam south of the village of Springville; a new power plant including four tube turbines with a total installed capacity of 4,400 kilowatts; and a power transmission line from the new power plant to the existing downstream Springville power plant. Maximum flooded pool elevation would be 1,200 feet and would inundate 1,600 acres of upland area. Plan would require the purchase of five structures and the abandonment of several roads within the pool area. Dam would regulate streamflow such that the existing Springville power plant would be able to increase its power output without modification. Dam would also be operated to extend the whitewater rafting season in Zoar Valley by 2 months.	Plan 1B consists of construction of a 150-foot high roller-compacted concrete dam south of the village of Springville; a new power plant including two Francis turbines with a total installed capacity of 3,900 kilowatts; and a power transmission line from the new power plant to the existing downstream Springville power plant. Maximum flooded pool elevation would be 1,250 feet and would inundate 3,200 acres of upland area. Plan would require the purchase of 34 structures, abandonment of several roads within the pool area, and the relocation of 12,000 LF of railroad tracks and 13,500 LF of State Route 39. Dam would regulate streamflow such that the existing Springville power plant would be able to increase its output without modification. Dam would also be operated to extend the whitewater rafting season in Zoar Valley by 2 months.	Plan 1C consists of construction of a 200-foot high roller-compacted concrete dam south of the village of Springville; a new power plant including three Francis turbines with a total installed capacity of 13,400 kilowatts; and a power transmission line from the new power plant to the existing downstream Springville power plant. Maximum flooded pool elevation would be 1,300 feet and would inundate 5,000 acres of upland area. Plan would require the purchase of 74 structures, abandonment of several roads within the pool area and relocation of 22,900 LF of railroad tracks and 22,100 LF of State Route 39. Dam would regulate streamflow such that the existing Springville power plant would be able to increase its output without modification. Dam would also be operated to extend the whitewater rafting season in Zoar Valley by 2 months.	Similar to Plan 1A. In addition to the features of Plan 1A, the existing Springville power plant would be expanded with the addition of a 500-kilowatt tube turbine to take maximum advantage of the streamflow regulation provided by the 100-foot high upstream dam.
2. First Cost (1)				
Federal	Not Estimated	Not Estimated	Not Estimated	Not Estimated
Non-Federal	Not Estimated	Not Estimated	Not Estimated	Not Estimated
Total	$20,830,000	$41,200,000	$73,700,000	$21,000,000
3. Annual Costs (2)				
Interest	$ 1,996,000	$ 3,946,400	$ 7,705,400	$ 2,012,400
Amortization	500	900	1,800	500
Annual O&M	362,000	535,000	1,002,000	432,000
Total	$ 2,358,500	$ 4,482,300	$ 8,709,200	$ 2,444,900
4. Average Annual Benefits (3)				
Flood Damage Reduction	$ 280,400	$ 353,900	$ 353,900	$ 280,400
Hydropower	853,100	1,862,400	3,117,000	837,500
Recreation	40,200	40,200	40,200	40,200
Total	$ 1,173,700	$ 2,256,500	$ 3,511,100	$ 1,158,100
5. Benefit-to-Cost Ratio (3)	0.5	0.5	0.4	0.5
6. Average Annual Net Benefits (3)	-$ 1,184,800	-$ 2,225,800	-$ 5,198,100	-$ 1,286,800
7. Significant Environmental Impacts	Adverse impacts expected from this plan would be the inundation of approximately 1,600 acres of bottom land and upland terrestrial habitat. A number of mammals, birds, and reptiles may be lost or displaced into other nearby areas. A variety of vegetation types ranging from grasses to hardwood trees that provide feeding, resting, nesting, and rearing habitat would be lost. Some deer movement patterns may be altered. Stream habitat and associated coldwater fisheries trout habitat would be changed to a warmwater reservoir fish habitat with a fluctuating water regime. Water quality downstream of the project would be expected to temporarily decline during construction due to an increase in siltation and turbidity. Also, an increase in water temperatures within the reservoir could lead to some disruption in water temperatures downstream of the project, which could have a detrimental effect upon the existing temperature-dependent, coldwater trout and salmon fisheries.	Adverse impacts that would be expected from this plan would be the inundation of approximately 3,200 acres of bottom land and upland terrestrial habitat. A number of mammals, birds, and reptiles would be lost or displaced into other nearby areas. A variety of vegetation types ranging from grasses to hardwood trees provide feeding, resting, nesting, and rearing habitat would be lost. Some deer movement patterns may be altered. Stream habitat and associated coldwater fisheries trout habitat would be changed to a warmwater reservoir fish habitat with a fluctuating water regime. Water quality downstream of the project would be expected to temporarily decline during construction due to an increase in siltation and turbidity. Also, an increase in water temperature within the reservoir could lead to some disruption in water temperatures downstream of the project, which could have a detrimental effect upon the existing temperature-dependent, coldwater trout and salmon fisheries.	Adverse impacts that would be expected from this plan would be the inundation of approximately 5,000 acres of bottom land and upland terrestrial habitat. A number of mammals, birds, and reptiles would be lost or displaced into other nearby areas. A variety of vegetation types ranging from gasses to hardwood trees that provide feeding, resting, nesting, and rearing habitat would be lost. Some deer movement patterns may be altered. Stream habitat and associated coldwater fisheries trout habitat would be changed to a warmwater reservoir fish habitat with a fluctuating water regime. Water quality downstream of the project would be expected to temporarily decline during construction due to an increase in siltation and turbidity. Also, an increase in water temperature within the reservoir could lead to some disruption in water temperatures downstream of the project, which could have a detrimental effect upon the existing temperature-dependent, coldwater trout and salmon fisheries.	The significant impacts of this plan would be the same as those described for Plan 1A.
8. Carry Forward into Feasibility Phase	No.	No.	No.	No.

Table 6 - Assessment, Evaluation, and Comparison of Preliminary Alternative Plans (Cont'd)

Item	Plan 1E (150-Foot High Dam, Modify Existing Powerhouse - See Plate 2)	Plan 1F (200-Foot High Dam, Modify Existing Powerhouse - See Plate 3)	Plan 2 (Levee/Floodwall at Arcade - See Plate 4)	Plan 3A (Overflow Channel - See Plate 5)
1. Plan Description	Similar to Plan 1B. In addition to the features of Plan 1B, the existing Springville power plant would be expanded with the addition of a 1,000-kilowatt Francis turbine to take maximum advantage of the streamflow regulation provided by the new 150-foot high upstream dam.	Similar to Plan 1C. In addition to the features of Plan 1C, the existing Springville power plant would be expanded with the addition of two 1,000-kilowatt Francis turbines to take maximum advantge of the new 200-foot high upstream dam.	Plan 2 consists of construction of a 4-foot high levee/floodwall system along the right bank and a 2-foot high berm on the left bank of Clear Creek just upstream of its confluence with Cattaraugus Creek. In addition, to stabilize the eroding creek bank, the right bank of Clear Creek would be riprapped. Plan would reduce flood damages in Arcade by about 75 percent.	Plan 3A consists of obtaining a flowage easement from the Seneca Indian Nation for an area approximately 5,000 feet in length and 1,000 feet wide on the north flood plain of Cattaraugus Creek. The beach area adjacent to the flowage easement would also be lowered to +5 Low Water Datum. Further, annual loosening and breaking up of windrow ice, which forms along the lakeward margin of the beach berm, would also be performed. In this manner, when ice jams the mouth of Cattaraugus Creek and causes the creek waters to rise, the rising water would have an alternate outlet to Lake Erie without flooding adjacent communities. Plan would reduce damages from ice jam flooding in the Sunset Bay area by about 60 percent.
2. First Cost (1)				
Federal	Not Estimated	Not Estimated	Not Estimated	$153,000
Non-Federal	Not Estimated	Not Estimated	Not Estimated	167,000
Total	$41,300,000	$73,900,000	Range of $500,000-$1,000,000	$320,000
3. Annual Costs (2)				
Interest	$ 4,130,300	$ 7,726,400	Not Estimated	$ 27,700
Amortization	1,000	1,800	Not Estimated	500
Annual O&M	604,000	1,072,000	Not Estimated	5,800
Total	$ 4,735,300	$ 8,800,200	Range of $44,000-$88,000	$ 34,000
4. Average Annual Benefits (3)				
Flood Damage Reduction	$ 353,900	$ 353,900	$ 13,100	$141,400
Hydropower	1,936,500	3,308,500	0	0
Recreation	40,200	40,200	0	0
Total	$ 2,330,600	$ 3,702,600	$ 13,100	$141,400
5. Benefit-to-Cost Ratio (3)	0.5	0.4	Range of 0.3-0.1	4.2
6. Average Annual Net Benefits (3)	-$ 2,404,700	-$ 5,097,600	Negative	$107,400
7. Significant Environmental Impacts	The significant impacts of this plan would be the same as those described for Plan 1B.	The significant impacts of this plan would be the same as those described for Plan 1C.	Significant environmental impacts associated with this plan would be short-term disruption to water quality during construction. There would be some immediate loss of existing benthic habitat within Clear Creek since riprap would be placed below the ordinary high-water level. However, benthic repopulation on the submerged riprap would be expected in a short period of time. Submerged riprap would also provide some cover and foraging habitat for fish. Construction would cause a temporary increase in turbidity and siltation within the creek. This may cause temporary distress to fish. However, most fish would be expected to temporarily move out of the immediate construction area during the time of construction. Some riparian vegetation (mainly overhanging trees and shrubs) would be destroyed.	Since this alternative involves little disturbance other than lowering of the beach berm, it is expected that there would be little or no significant impacts to the surrounding environment. Some riparian vegetation such as Cottonwood trees, dogwood shrubs, forbs, and grasses would be destroyed.
8. Carry Forward into Feasibility Phase	No.	No.	No.	Yes.

Table 6 - Assessment, Evaluation, and Comparison of Preliminary Alternative Plans (Cont'd)

Item	Plan 3B (Ice-Retention Structure - See Plate 6)	Plan 4 ("No-Action")
1. Plan Description	Plan 3B consists of constructing a 250-foot long ice-retention structure and a 250-foot long adjacent floodway for passage of flood flows just upstream of the town of Versailles (creek mile 16). The ice-retention structure would also have eight gated low flow openings incorporated into its design to permit passage of salmonids as well as other fish species. During the late fall and winter ice-forming periods, flow would be reduced for the purpose of forming a pool to develop a stable ice cover. The pool would be maintained during the winter and would prevent ice from flowing downstream and jamming at the creek mouth. The pool would then be drained in the spring when the threat of ice jam flooding was over. Plan would reduce ice jam flooding in the Sunset Bay area by about 90 percent.	The "No-Action" Plan, as the name implies, means that no project for flood control and allied purposes would be constructed by the Corps of Engineers in the Cattaraugus Creek Basin. As such, flooding in the basin would continue, with average annual damages totalling about $353,200. Further, the opportunity to reduce the cost of electricity in the basin would be foregone. In addition, demand for additonal recreational boating, fishing, and whitewater rafting/boating facilities would also not be met.
2. First Cost (1)		
Federal	$ 647,000	$ 0
Non-Federal	38,000	0
Total	$ 685,000	$ 0
3. Annual Costs (2)		
Interest	$ 60,300	$ 0
Amortization	1,000	0
Non-Federal	8,800	0
Total	$ 70,100	$ 0
4. Average Annual Benefits (3)		
Flood Damage Reduction	$ 199,100	$ 0
Relocation	0	0
Recreation	0	0
Total	$ 199,100	$ 0
5. Benefit-to-Cost Ratio (3)	2.8	N/A
6. Average Annual Net Benefits (3)	$ 129,000	$ 0
7. Significant Environmental Impacts	Adverse impacts of this plan would be short-term and confined mainly to the period of construction. A temporary decrease in water quality caused by an increase in turbidity and siltation due to construction could be expected. This could cause temporary distress to fish within the area and downstream of the project. The area on which the structure would be built would cover over existing benthic habitat. The ice retention structure itself may cause disruption of fish movement within this area; however, provisions in the design of the structure would be provided for fish movement. Ponding of water behind the structure would only occur during the ice formation season. During non-flooding periods, the creek would be allowed to flow at its normal rate.	Continued disruption to the ecosystem due to flooding and activities associated with it.
8. Carry Forward Into Feasibility Phase	Yes.	Yes.

(1) Based on October 1985 price levels. Does not include cost for mitigation of adverse environmental impacts that may be required.

(2) Based on October 1985 price levels and 8-5/8 percent interest rate. Period of analysis is 100 years for Plans 1A-1F and 50 years for Plans 2, 3A, and 3B. Includes interest during construction.

(3) Based on October 1985 price levels and 8-5/8 percent interest rate. Period of analysis is 100 years for Plans 1A-1F and 50 years for Plans 2, 3A, and 3B.

SECTION VI

STUDY MANAGEMENT

The purposes of this section are to provide an outline of the principal activities needed to complete the feasibility phase of the Cattaraugus Creek Study, the methodologies to be used, to describe the contemplated public involvement and coordination activities, and to provide information on the schedule for the remainder of the study. The primary goal in the reconnaissance phase has been to evaluate a wide range of alternative plans that would satisfy the planning objectives with the purpose of reducing the number of alternatives for further consideration. The evaluation to this point in time indicates that there are two preliminary improvement plans - Plans 3A (Overflow Channel) and 3B (Ice-Retention Structure) and the "No-Action" Plan (Plan 4) - that warrant further, detailed study in the feasibility phase. The management plan presented herein assumes that these two preliminary improvement plans, or some variation thereof, and the "No-Action" Plan warrant further consideration.

21. FEASIBILITY PHASE METHODOLOGY

The emphasis in the feasibility phase will be placed on refining the designs, quantities, and costs estimates for Plans 3A and 3B; refining the benefit analysis and economic evaluation for these plans; updating the environmental assessment for these plans; and developing mitigation plans to mitigate for unavoidable adverse environmental impacts. In addition, a Draft and Final Environmental Impact Statement and a 404(b)(1) Evaluation will be prepared.

The Study Flow Network (CPM) showing the activities involved in the feasibility phase is presented in Figure 8. With reference to the CPM, the future involvement of the interdisciplinary team in the feasibility phase is as follows:

a. Environmental.

Contract work consists of a contract with the U.S. Fish and Wildlife Service to complete the Fish and Wildlife Coordination Act activities and to conduct a 3-seasons biological survey; and a contract to conduct a cultural resources reconnaissance study. The in-house effort involves about 4 man-months to prepare the Draft and Final EIS and 404(b)(1) Evaluation; and 2-3/4 man-months to monitor contracts and provide input for the Draft and Final Feasibility Reports.

b. Economics.

Economics work includes refining the benefit analysis and economic evaluation for Plans 3A and 3B (2-1/2 man-months); and preparation of the Draft and Final Feasibility Reports (1-1/4 man-months).

c. Real Estate.

The real estate appraisal for Plans 3A and 3B will be conducted by North Central Division.

d. Hydrology and Hydraulics.

H&H work includes developing discharge-frequency, stage-frequency, stage-discharge and damage-frequency curves (5-1/2 man-months); ice data collection activities (2-1/2 man-months); analyzing the impacts of the Standard Project Flood for Plans 3A and 3B (3 man-months); refining plan designs (1-1/4 man-months); and preparation of the Draft and Final Feasibility Reports (3-1/4 man-months). Contract work consists of a contract with the Cold Regions Research Laboratory to assist in the design of the ice-retention structure.

e. Geotechnical.

Contract work includes a contract with the Ohio River Division Laboratory to analyze soil samples. In-house work includes: a sedimentation analysis (1-1/4 man-months); a foundation analysis (1/2 man-month); and preparation of the Draft and Final Feasibility Reports (1 man-month).

f. Engineering Design.

Design work includes the design of the ice-retention structure (1/2 man-month).

g. General Engineering.

The work involved includes preparation of the final cost estimates for Plans 3A and 3B (1-1/2 man-months).

h. Drafting.

About 2 man-months of in-house effort will be required to prepare visual aids for the public meetings and graphic displays for the Draft and Final Feasibility Reports.

i. Word Processing.

In-house word processing will be required to type information packets for the public meetings and the Draft and Final Feasibility Reports.

j. Reproduction.

Contract work consists of contracts to print the Reconnaissance Report and the Draft and Final Feasibility Reports.

k. Program Development.

About 2 man-months of in-house effort will be required to prepare budgetary documents.

1. Project Management and Planning.

The study manager is expected to spend approximately 50 percent of his time on feasibility phase activities primarily in coordinating efforts of the interdisciplinary team, preparation of materials for public meetings, coordination with other agencies and local interests, and report preparation. Including planning supervision, this in-house effort totals 10-1/2 man-months.

22. PUBLIC INVOLVEMENT AND COORDINATION

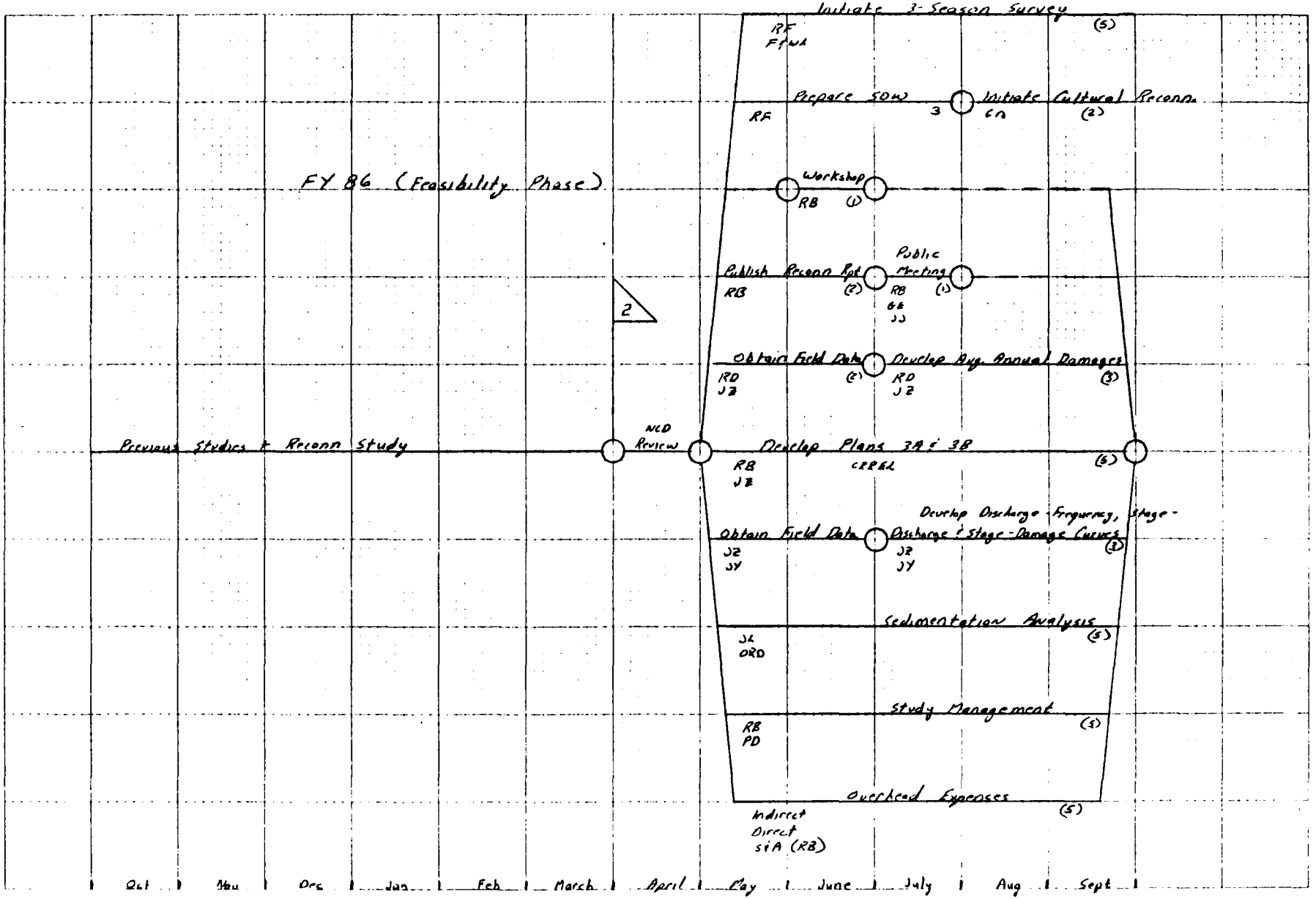
Close coordination will be maintained with principal study interests (i.e., USF&WS, NYSDEC, local government officials, Seneca Nation of Indians, and local interests) throughout the feasibility phase to obtain their input as the study progresses. Further, two public meetings will be held with the general public to keep them informed on the study progress and to solicit public comment. The first meeting will be held in the 4th Quarter of FY 86 to review the results of this reconnaissance study. The final public meeting will be held in the 1st Quarter of FY 88 to present the final findings of the feasibility study.

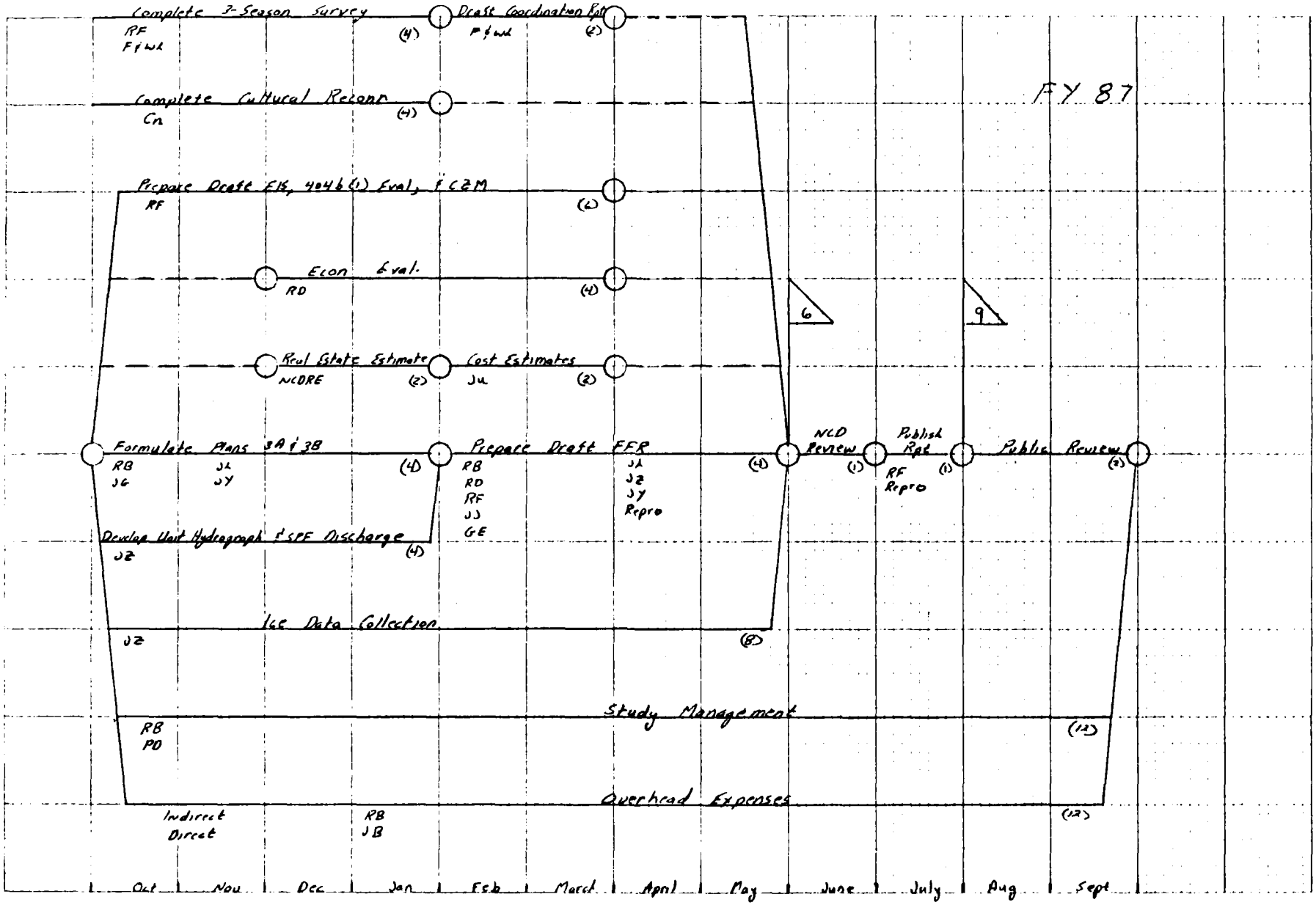
23. STUDY SCHEDULE

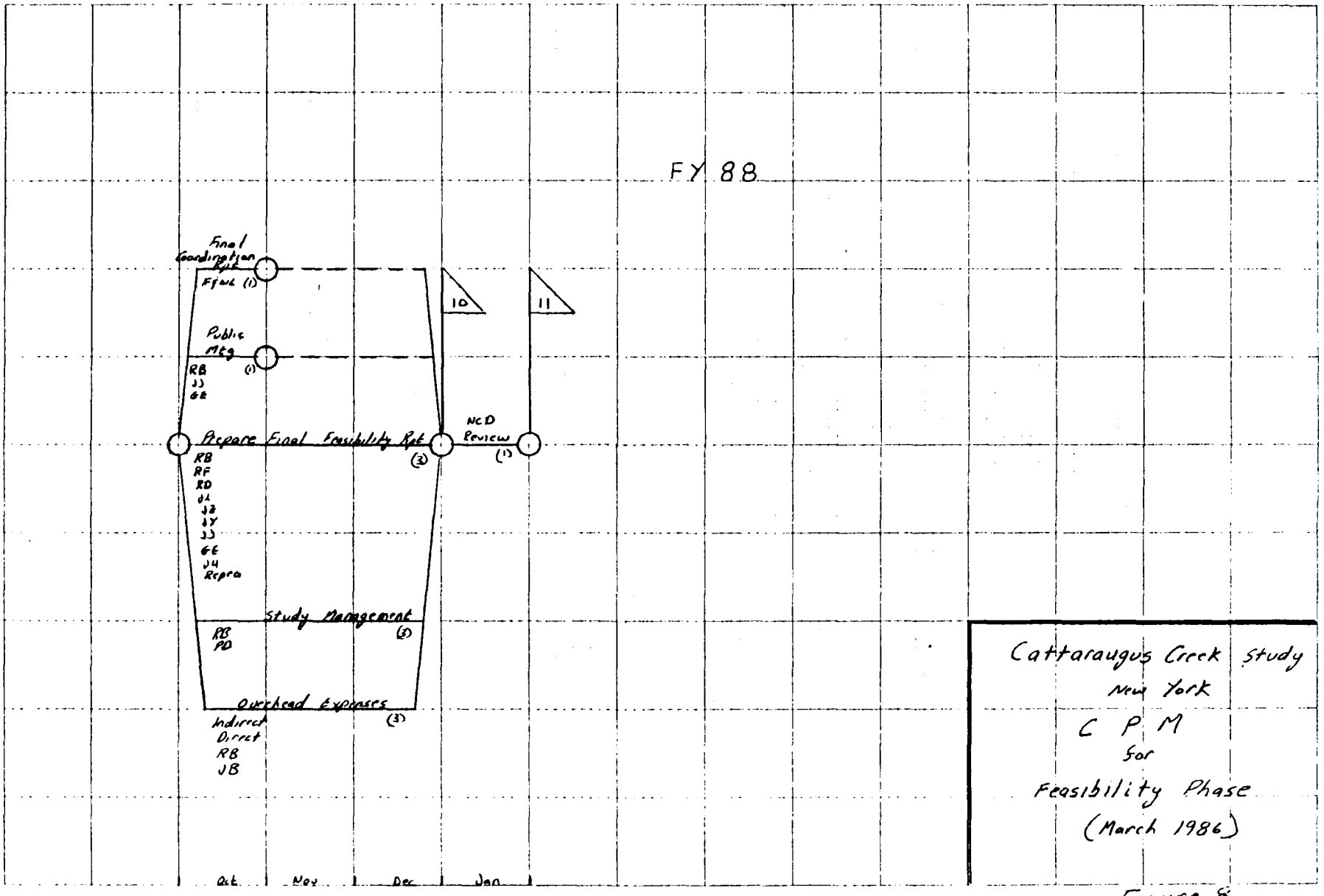
The milestone dates shown on the CPM are the same as the latest approved study schedule. From the CPM, the Draft Report, including Draft EIS, is scheduled for submittal to North Central Division in May 1987 (MS-6) and the Final Report, including Final EIS, in December 1987 (MS-10).

24. SCHEDULE OF MAJOR ACTIVITIES THROUGH CONSTRUCTION

The schedule for the major activities, assuming the final recommendation of this study is to implement a flood control plan, is shown on Figure 9. As indicated, following completion of the Feasibility Study in FY 88, the report would be sent forward for Washington level review and authorization. The General Design Memorandum (final design document) would then be initiated and is currently scheduled for completion by the end of FY 92. Plans and Specifications and Real Estate activities would follow, with initiation of construction projected to start in FY 95.


FY 86 (Feasibility Phase)
Initiate 3-Season Survey
(5)
RF
FFwA
Prepare SOW
3
Initiate Cultural Reconn.
RF
CA
(2)
Workshop
RB (1)
Public Meeting
Publish Reconn Rpt
RB
(2)
RB
GE
JJ
(1)
2
Obtain Field Data
RD
JZ
(2)
Develop Avg. Annual Damages
RD
JZ
(3)
Previous Studies & Reconn Study
NED Review
Develop Plans 3A & 3B
RB
JZ
CERCL
(5)
Develop Discharge - Frequency, Stage - Discharge & Stage - Damage Curves
Obtain Field Data
JZ
JY
JZ
JY
(3)
Sedimentation Analysis
JL
ORD
(5)
Study Management
RB
PD
(5)
Overhead Expenses
(5)
Indirect
Direct
SIA (RB)
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept


FY 87
Complete 3-Season Survey
RF
F&WL
(4)
Draft Coordination Pkt
F&WL
(2)
Complete Cultural Recons
Cn
(4)
Prepare Draft EIS, 4046(1) Eval, & CEM
RF
(2)
Econ Eval.
RD
(4)
6
9
Real Estate Estimate
NCORE
(2)
Cost Estimates
JL
(2)
Formulate Plans 3A & 3B
RB
JG
JL
JY
(4)
Prepare Draft FFR
RB
RD
RF
JJ
GE
JL
JZ
JY
Repro
(4)
NCD Review
(1)
Publish Rpt
RF
Repro
(1)
Public Review
(2)
Develop Unit Hydrograph & SPF Discharge
JZ
(4)
Ice Data Collection
JZ
(8)
Study Management
RB
PD
(12)
Overhead Expenses
Indirect
Direct
RB
JB
(12)
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept



Cattaraugus Creek Study
New York
C P M
for
Feasibility Phase
(March 1986)

Figure 8

PROPOSED SCHEDULE OF MAJOR ACTIVITIES
FLOOD CONTROL PROJECT AT THE MOUTH OF CATTARAUGUS CREEK

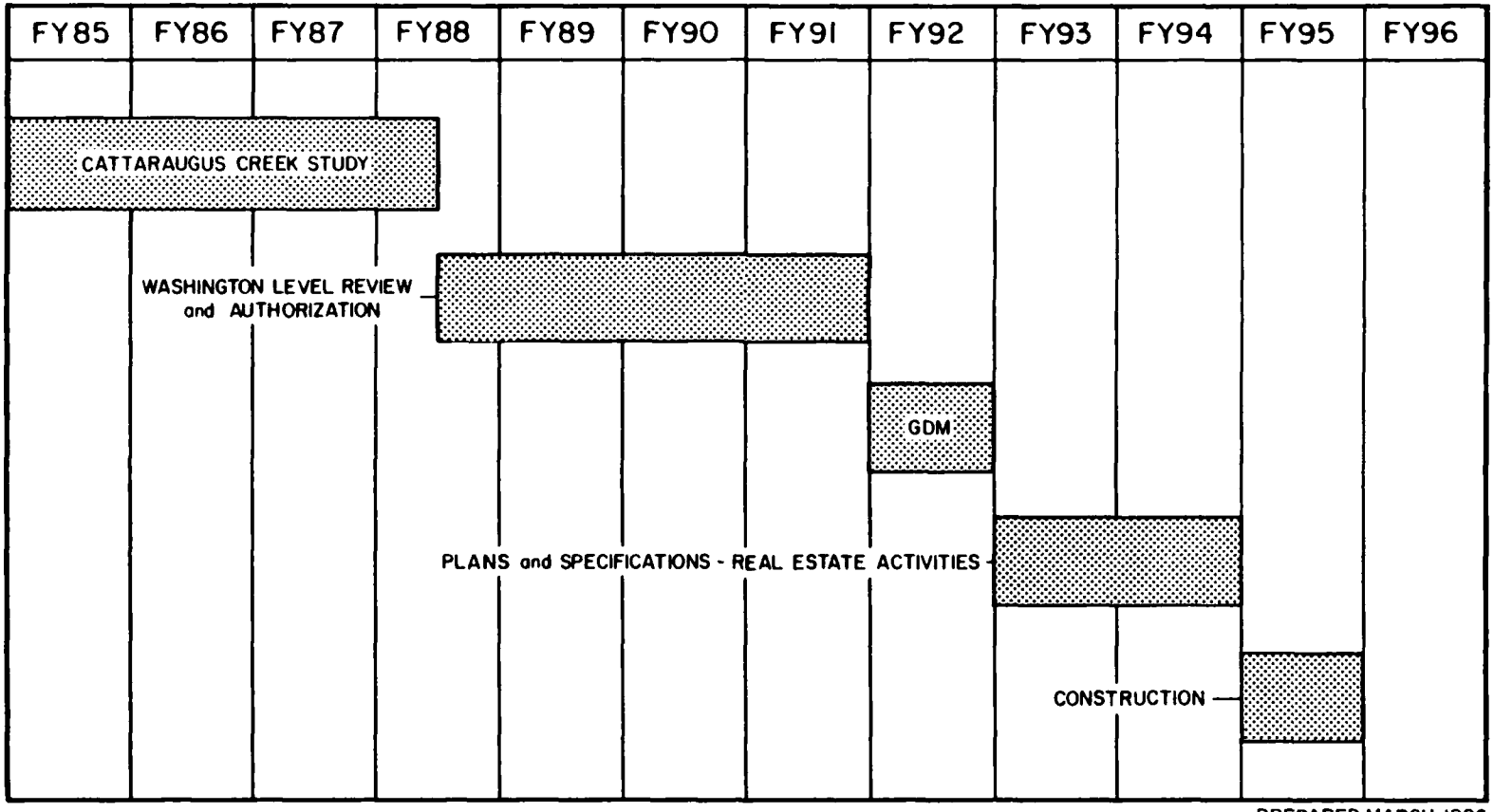


FIGURE 9

FIGURE 9

SECTION VII
CONCLUSIONS

The primary purpose of this section is to provide a summary of the significant conclusions reached during the reconnaissance phase of the Cattaraugus Creek Study.

25. CONCLUSIONS

Cattaraugus Creek is about 70 miles long and drains an area of about 558 square miles of Western New York as shown on Figure 1. The creek rises in the Appalachian plateau in Western New York and flows in a westerly direction to its mouth in Lake Erie, 25 miles southwest of Buffalo, New York. Terrain of the basin varies from the hilly, steep-sloped and narrow valleyed portion of the basin upstream of Gowanda to the flat-sloped and wide-valleyed Lake Erie plain downstream of Gowanda.

The Cattaraugus Creek Basin is predominantly rural; however, the main branch of the creek passes through the villages of Arcade, Gowanda, and Springville. The lower 16 miles of the creek also flows through the Cattaraugus Indian Reservation. The main tributaries of the creek include Clear Creek at Arcade, Elton Creek, Buttermilk Creek, Spring Brook, Spooner Creek, South Branch Cattaraugus Creek, and Clear Creek at Iroquois.

The primary water resources need for which a solution is sought under this authority is to reduce flood damages within the Cattaraugus Creek Basin. In addition, for the dam/reservoir plans that were developed, the addition of hydroelectric power generating facilities and recreation facilities were also considered to maximize the economic efficiency of the basic flood control plans. As possible solutions, nine preliminary alternatives, in addition to the "No-Action" option, were formulated and assessed. The assessment indicated that:

a. Alternative Plans 3A (Overflow Channel) and 3B (Ice-Retention Structure), in addition to the "No-Action" Plan 4, warranted further, detailed analysis in the feasibility phase of the study.

b. Alternative plans 1A, 1B, 1C, 1D, 1E, 1F, and 2 should be eliminated from further consideration due to lack of economic feasibility (i.e., B/C ratios less than 1.0).

SECTION VIII
RECOMMENDATIONS

I recommended that the District proceed with the feasibility phase of the Cattaraugus Creek Study and prepare a Final Feasibility Report.

Daniel R. Clark

DANIEL R. CLARK
Colonel, Corps of Engineers
District Commander

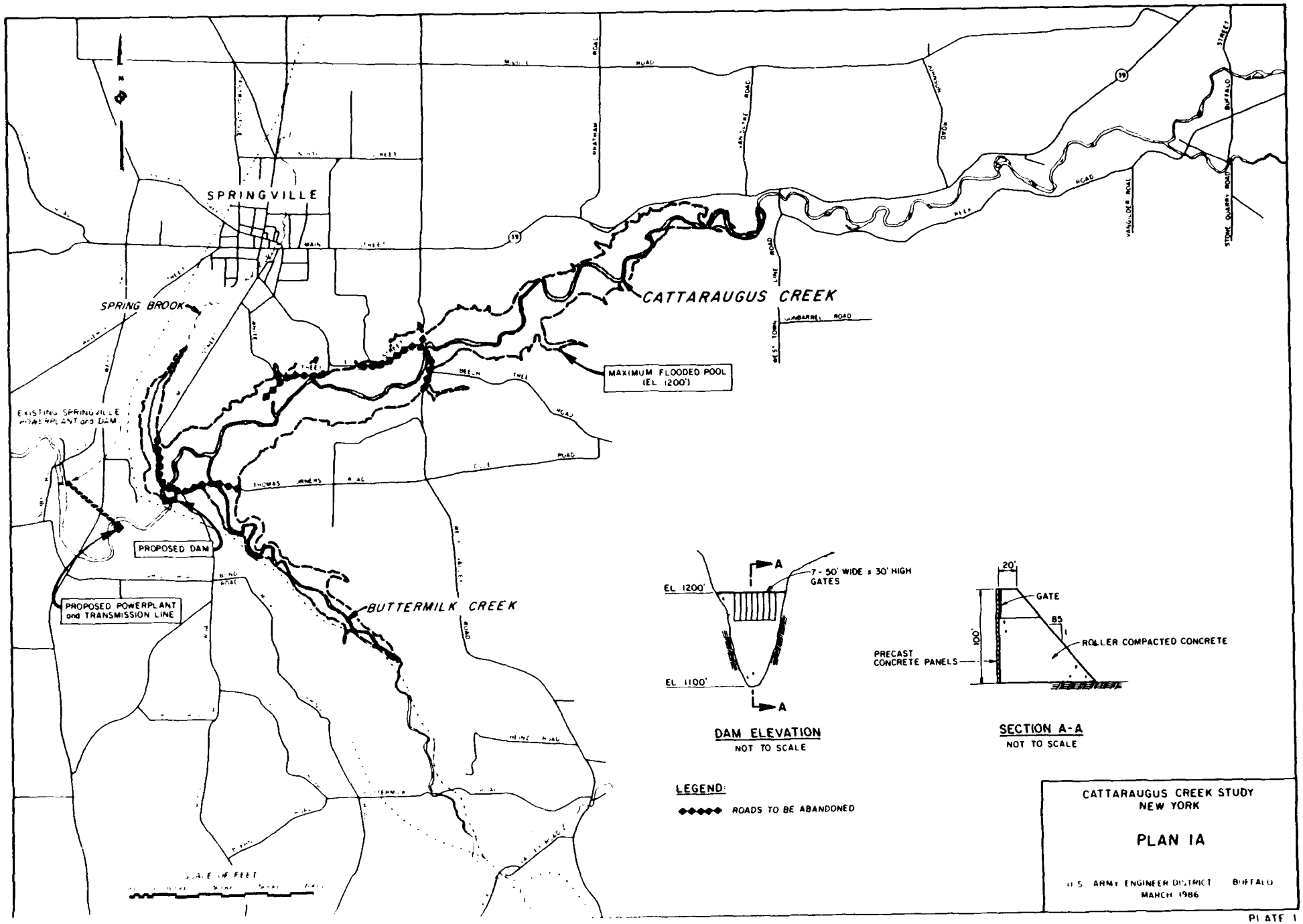
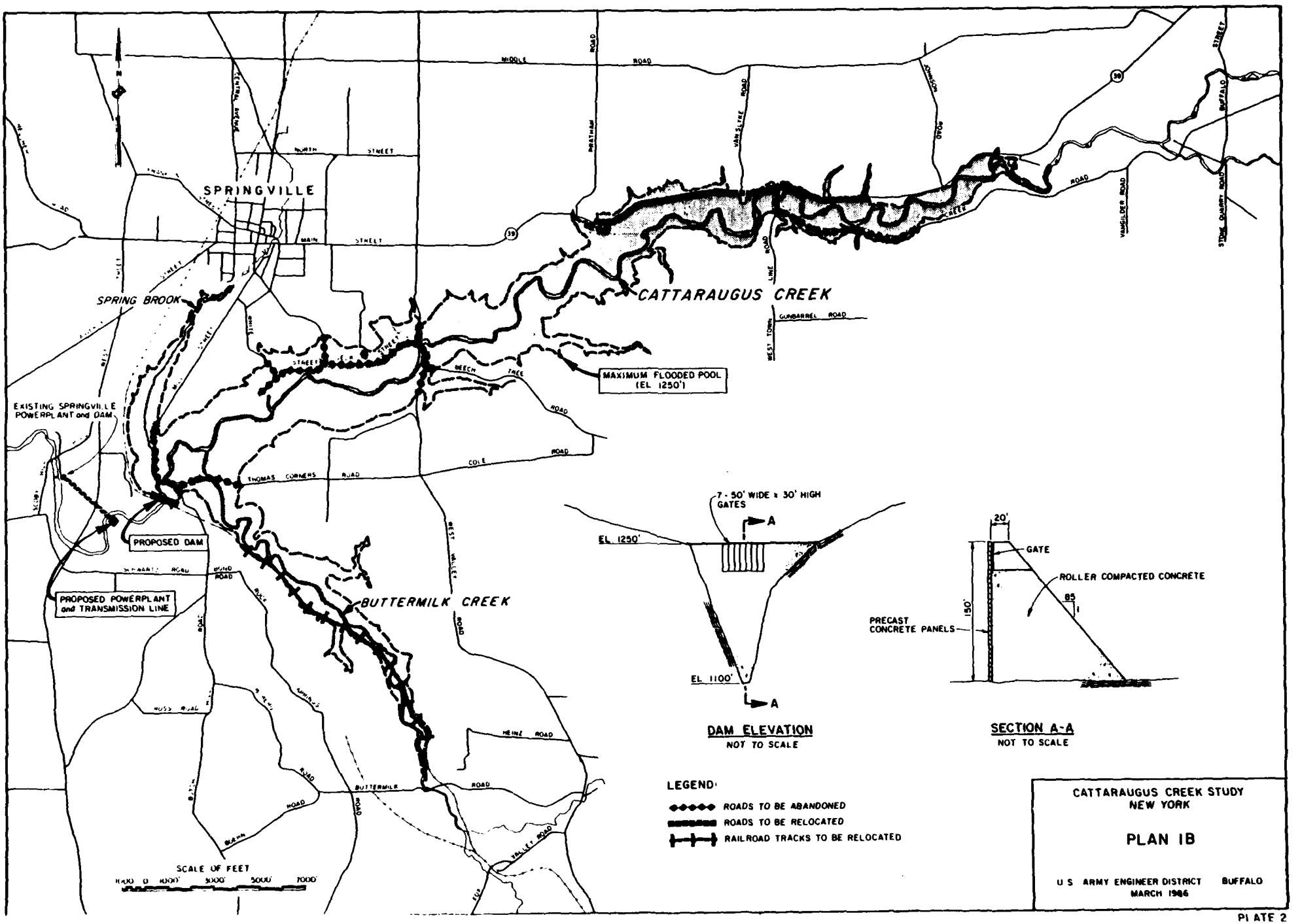

SPRINGVILLE
SPRING BROOK
CATTARAUGUS CREEK
MAXIMUM FLOODED POOL (EL 1200')
EXISTING SPRINGVILLE POWERPLANT and DAM
PROPOSED DAM
PROPOSED POWERPLANT and TRANSMISSION LINE
BUTTERMILK CREEK
SCALE IN FEET
A
7 - 50' WIDE x 30' HIGH GATES
EL 1200'
EL 1100'
A
DAM ELEVATION
NOT TO SCALE
20'
GATE
85
100'
ROLLER COMPACTED CONCRETE
PRECAST CONCRETE PANELS
SECTION A-A
NOT TO SCALE
LEGEND:
ROADS TO BE ABANDONED
CATTARAUGUS CREEK STUDY
NEW YORK
PLAN IA
U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

PLATE 1



CATTARAUGUS CREEK STUDY
NEW YORK

PLAN 1B

U S ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

PLATE 2

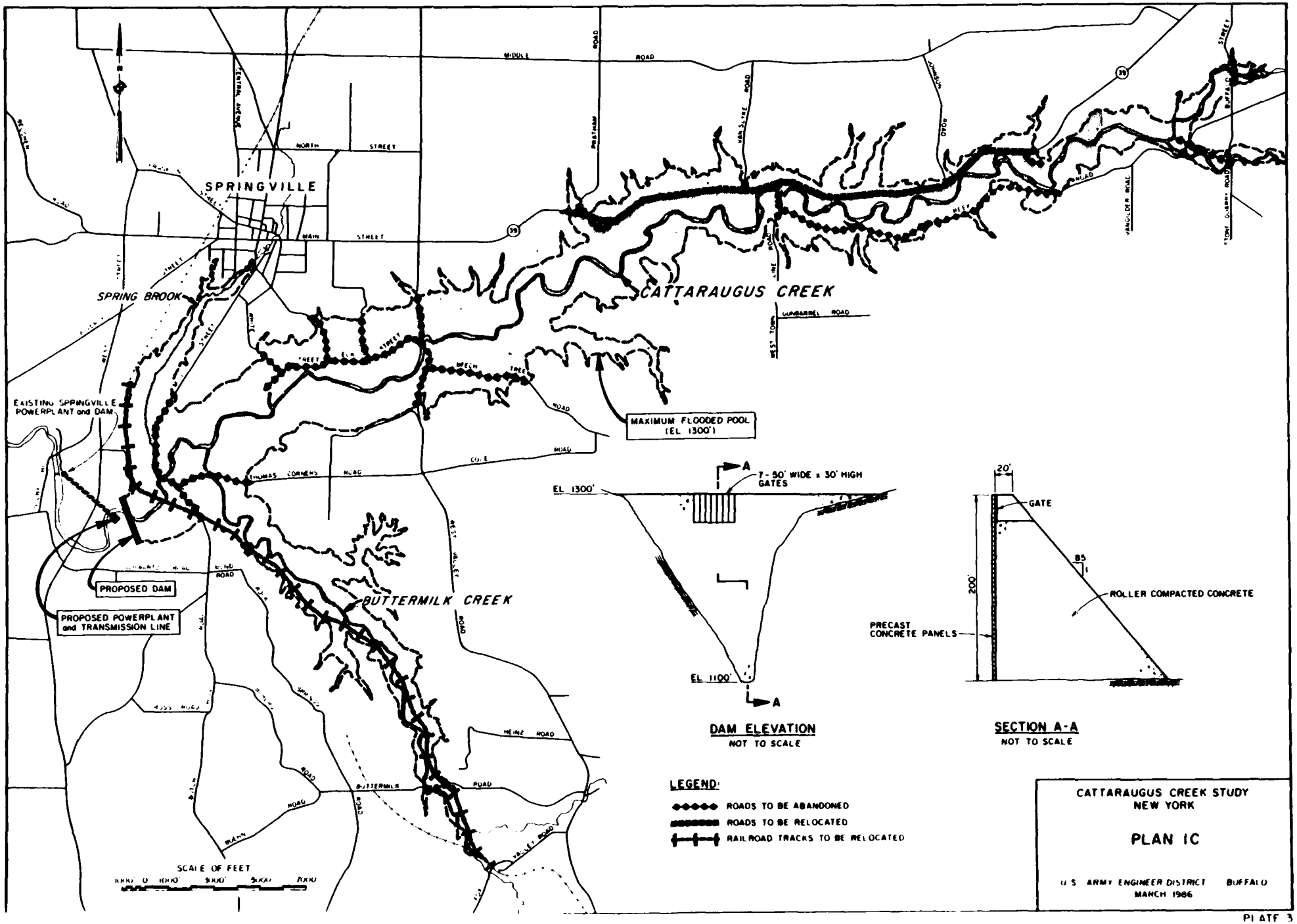
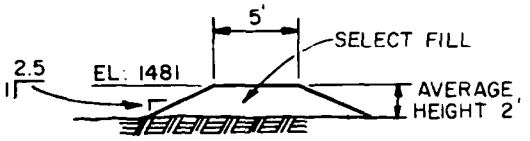
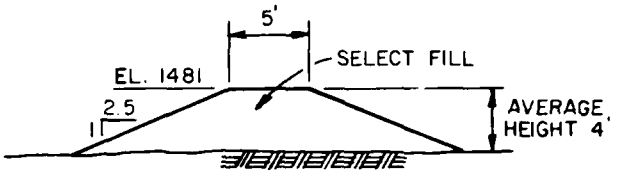

SPRINGVILLE
SPRING BROOK
CATTARAUGUS CREEK
BUTTERMILK CREEK
EXISTING SPRINGVILLE POWERPLANT and DAM
PROPOSED DAM
PROPOSED POWERPLANT and TRANSMISSION LINE
MAXIMUM FLOODED POOL (EL 1300')
MIDDLE ROAD
NORTH STREET
MAIN STREET
PRATHAM ROAD
VAN SLYKE ROAD
ANGLOLA ROAD
WEST TOWN LINE ROAD
GUNBARREL ROAD
MESH TREE ROAD
COLE ROAD
THOMAS CORNERS ROAD
BLISS ROAD
WEST VALLEY ROAD
HEINZ ROAD
BUTTERMILK ROAD
MAIN ROAD
VALLEY ROAD
SCALE OF FEET
EL 1300'
EL 1100'
7 - 50' WIDE x 30' HIGH GATES
DAM ELEVATION
NOT TO SCALE
20'
GATE
.85:1
200'
ROLLER COMPACTED CONCRETE
PRECAST CONCRETE PANELS
SECTION A-A
NOT TO SCALE
LEGEND:
ROADS TO BE ABANDONED
ROADS TO BE RELOCATED
RAILROAD TRACKS TO BE RELOCATED
CATTARAUGUS CREEK STUDY
NEW YORK
PLAN IC
U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

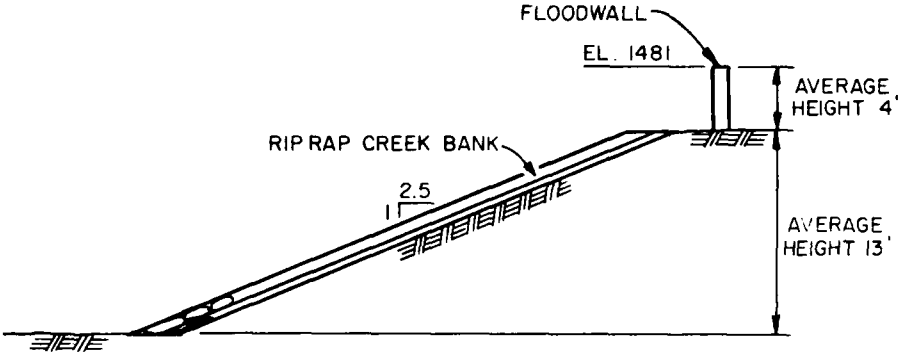
PLATE 3



TYPICAL BERM SECTION

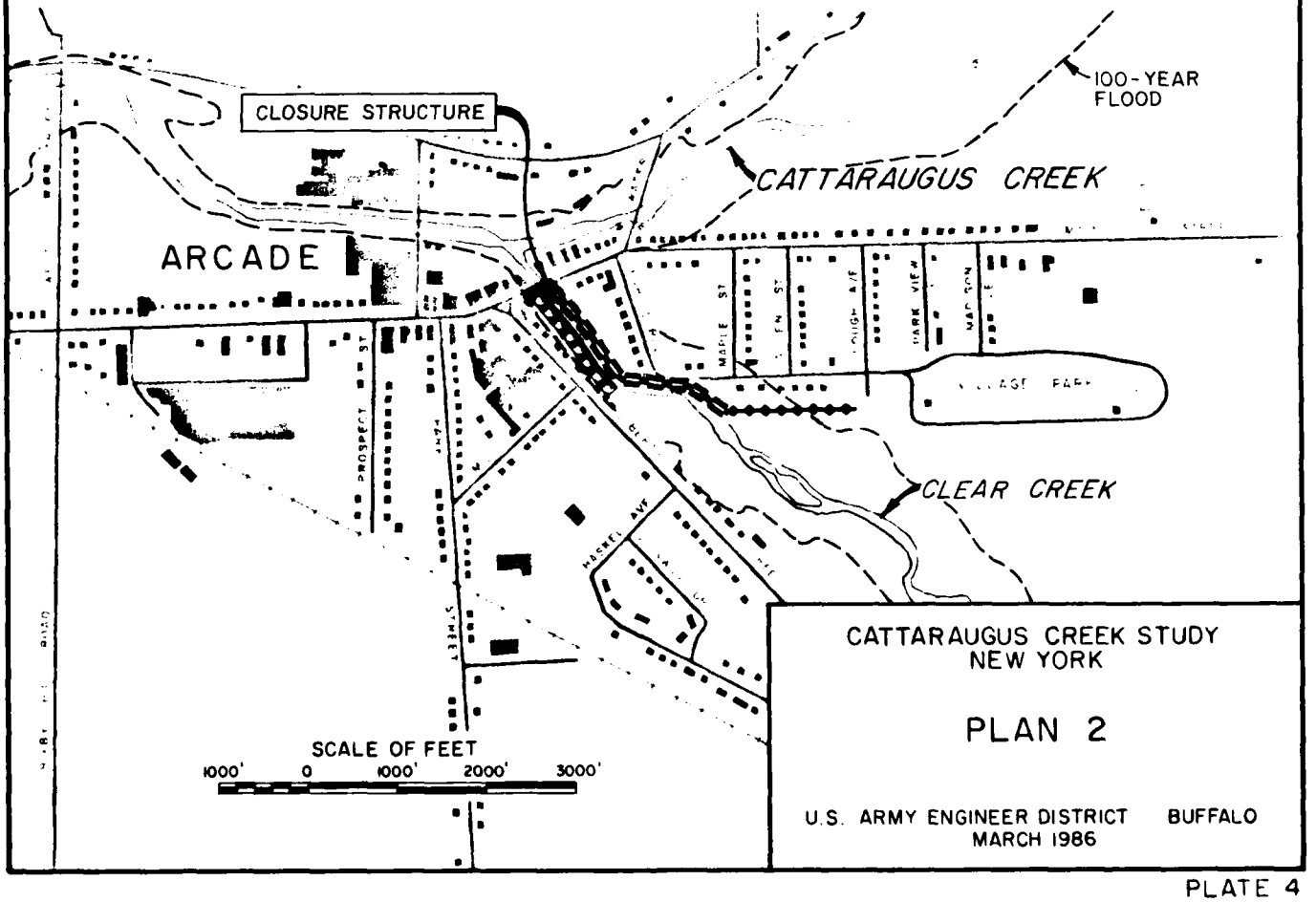


TYPICAL LEVEE SECTION



TYPICAL FLOODWALL SECTION

LEGEND:
- BERM
- FLOODWALL
- LEVEE



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PLAN 2

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PLATE 4

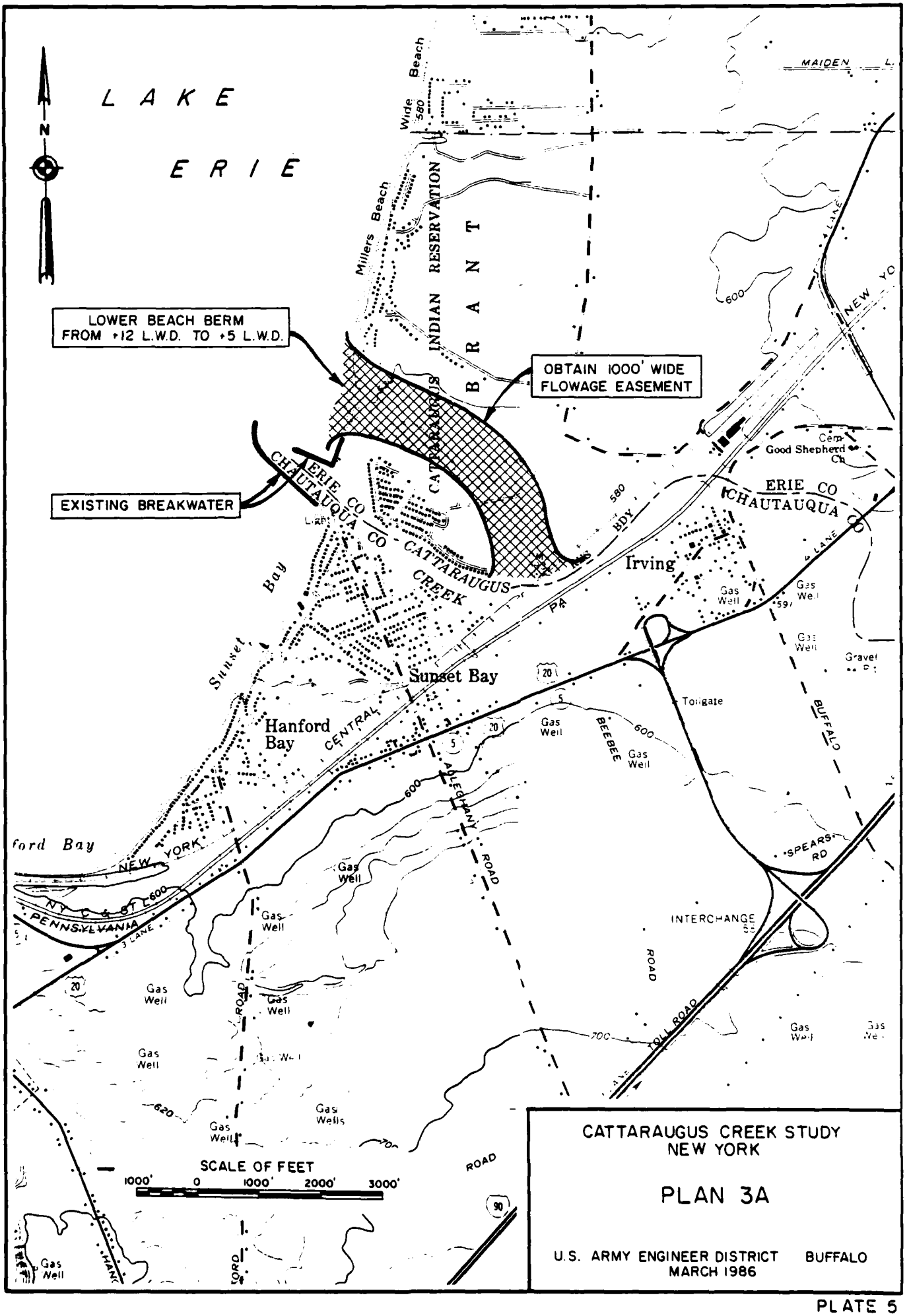
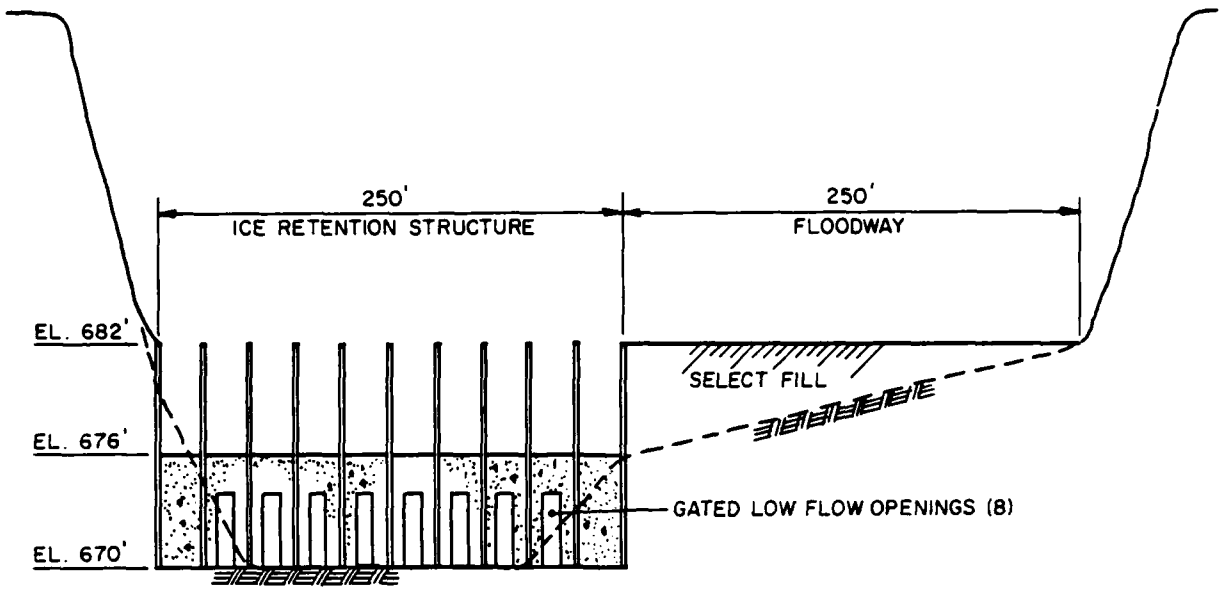
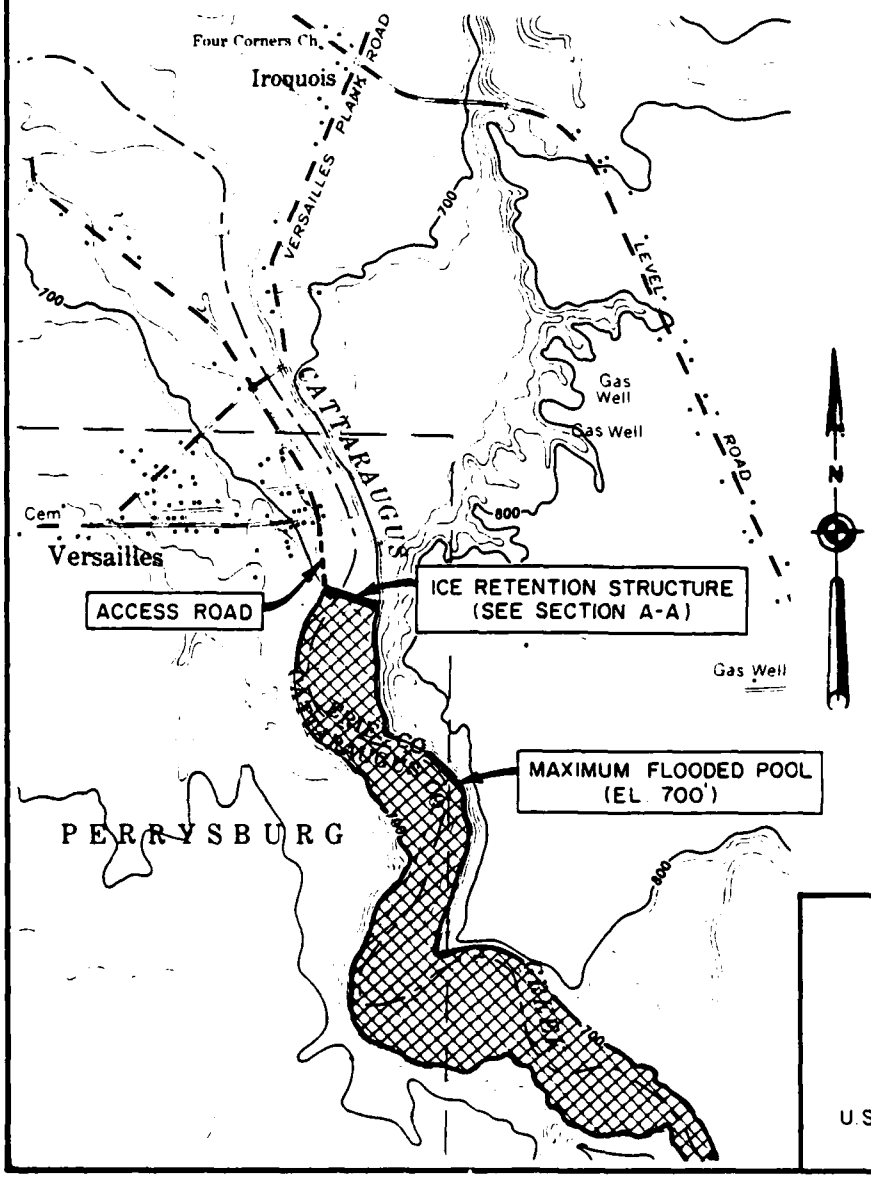

LAKE ERIE
N
LOWER BEACH BERM FROM +12 L.W.D. TO +5 L.W.D.
EXISTING BREAKWATER
OBTAIN 1000' WIDE FLOWAGE EASEMENT
INDIAN RESERVATION
CATTARAUGUS
ERIE CO
CHAUTAUQUA CO
CATTARAUGUS CREEK
Irving
Sunset Bay
Hanford Bay
Tollgate
INTERCHANGE
SCALE OF FEET
1000' 0 1000' 2000' 3000'
CATTARAUGUS CREEK STUDY
NEW YORK
PLAN 3A
U.S. ARMY ENGINEER DISTRICT BUFFALO
MARCH 1986

PLATE 5



SECTION A-A



CATTARAUGUS CREEK STUDY
NEW YORK

PLAN 3B

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MARCH 1986

PLATE 6

END

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